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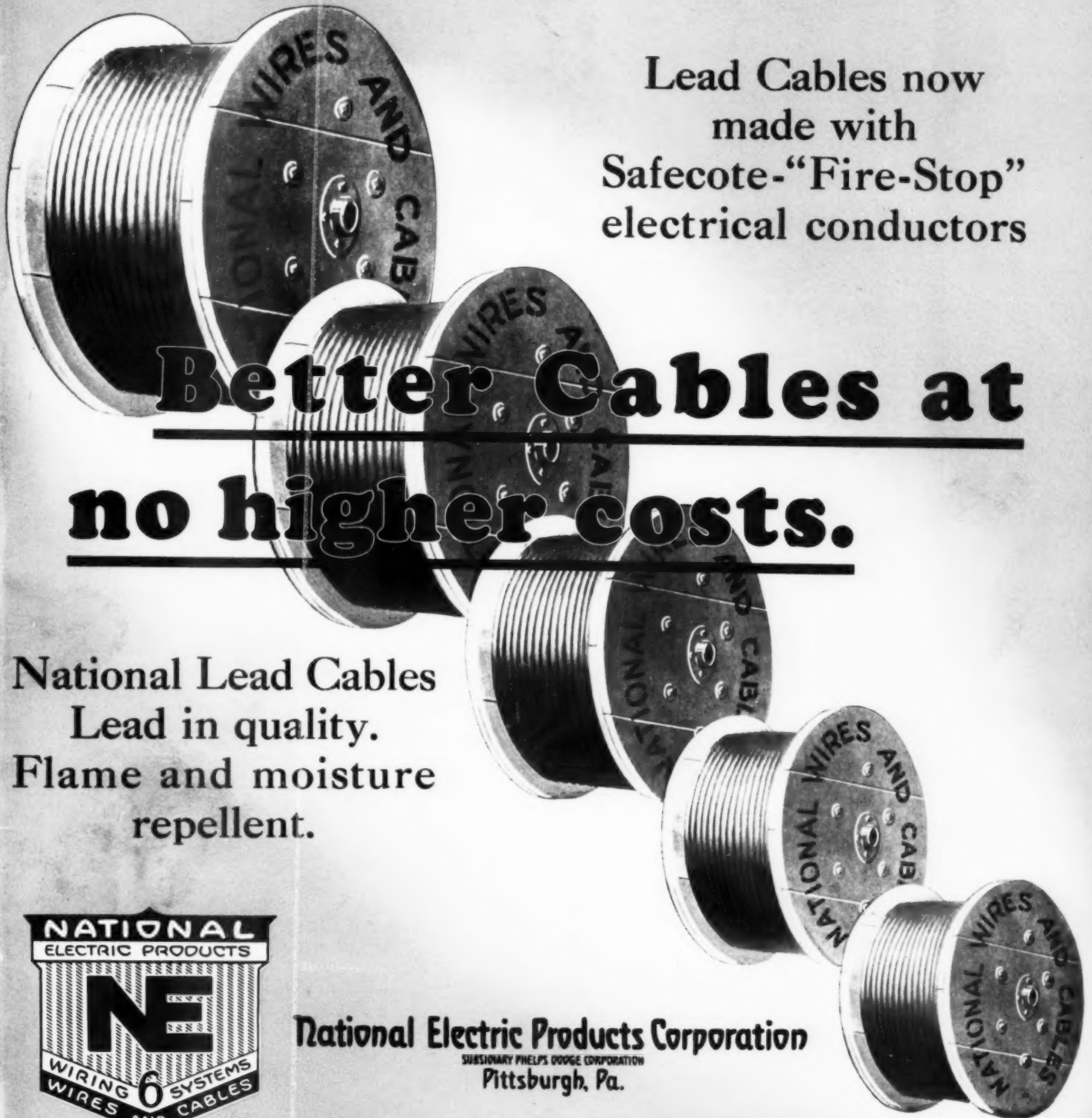
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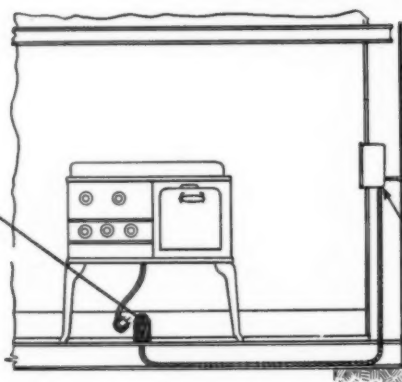
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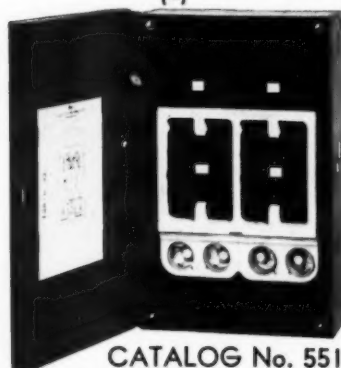
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VOLUME 33
NUMBER 9

electrical contracting

WITH WHICH IS CONSOLIDATED ELECTRICAL RECORD
S. B. WILLIAMS, EDITOR AND GENERAL MANAGER

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CONTENTS FOR JULY, 1934

John Wise	5
Cost Factors Involved in Labor Rotation and Labor Shifts by Ray Ashley.....	6
Code Rulings and Explanations.....	9
Wiring of 80 Kilowatt Home by H. S. Gano....	10
Wiring for the New Two-Element Three-Light Lamps by James Paul Warner.....	11
Motor Repair Shops Seek Code.....	13
Averages Over 75 Gas-Station Jobs a Month..	14
Editorials	16
Code Chats	18
Contracting News	20
Manufacturers News	39
Index to Advertisers.....	46

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Right down your alley,

Mr. Contractor . . . RCA VICTOR

Sound Systems for department stores

Got a department store in your town? If you have, you are in line for a sweet piece of RCA Victor Centralized Sound business. For, here is a sound application that is gathering real speed and putting man-sized money in the pockets of aggressive contractors.

Essentially, department store sound systems consist of microphone pickup in the central office, and loudspeaker situations all over the store. The use ranges from pep talks, instruction and entertainment for the employees before store hours, to bargain announcements, general promotion, and musical entertainment for the patrons during store hours.

Scores of well-known stores have installed centralized sound systems and are loud in their praises for them, from the prestige, utility and business-building standpoints. During the month of July, aggressive RCA Victor advertising will back up your efforts. The build up of this business will naturally be directed to you.

So, put on your salesman's suit and let's co-operate. Contact your local stores, and put yourself in line for profit of both sale and installation. The business is yours—all Centralized Sound business is yours. RCA Victor sales assistance and engineering advice is yours for the asking. Get in touch with us.



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Drop us a line for specific information about department store jobs in your locality. We will be glad to lend our assistance in figuring and quoting on these jobs.

RCA Victor Sound Systems are available for every conceivable purpose. Write for information about any or all of the following:

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- ☐ Centralized Radio
- ☐ Sound Reenforcing
- ☐ Simplified Antenna Systems
- ☐ Public Address

Time to Act

THE Administration's Housing Bill is now law. Because of its importance to the recovery program it will be sold to the public. Remodeling of old homes and building of new will result.

It is an opportunity for the electrical industry. What is it going to do about it?

PRIOR to the depression adequate wiring was being promoted in a great many cities through the Red Seal plan. In back of this plan was the Society for Electrical Development, the national organization representative of the entire industry.

Only a handful of cities now have electrical leagues that are engaged in promotional activities and of these only a few are doing any active work with Red Seal.

In spite of a lack of appropriation for this type of work the percentage of new homes that are wired Red Seal in cities that have had a program is still large owing to the momentum of the movement. Such meager studies as have been made also indicate that the general average of adequacy in cities that have promoted the Red Seal plan has been improved.

ADEQUACY, however, has been found to be more than a schedule of outlets. It is a planned wiring system built to take care of present-day demands for an adequate use of electricity as well as providing flexibility for the future. Because

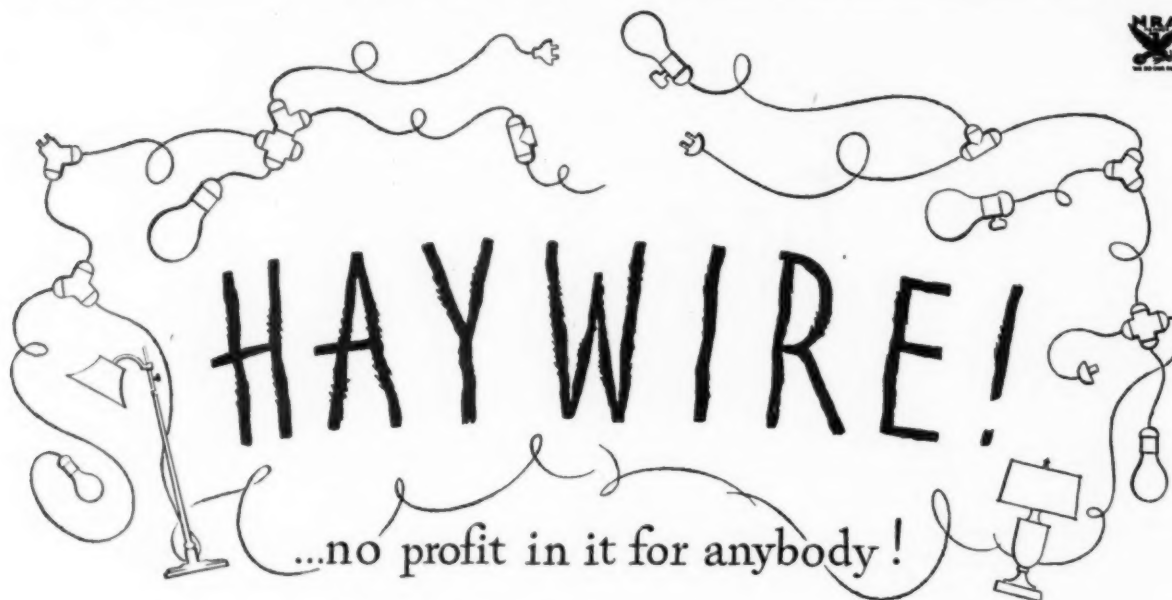
Red Seal did not provide this type of adequacy the industry has drawn up a set of house wiring standards that has received the approval and endorsement of every national electrical association.

Unlike Red Seal these standards provide for old as well as new homes. While it is true that an old home could get a Red Seal Certificate if it were rewired to the specifications, the effort was entirely on new construction.

The new Housing Act is designed to promote remodeling as well as new construction so that it would seem as though there were an opportunity to start something along the lines of bringing old homes nearer to the standard for adequate wiring.

SO far nothing has been done to promote these standards either by selling them to the public, or to the industry itself. Something should be done, and done promptly, if the electrical industry is to receive the full advantage of the activities that will result from the new Housing Act.

Obviously the industry is not organized at the present time to act as a unit and this, of course, is a decided weakness in any national promotion such as adequate wiring. Some kind of organization is essential, if it only be a committee, in order to sell adequate wiring first, to the industry, then to the architects, builders and such financial institutions as will operate under the Act and finally to find some way of bringing the story to the public.



Half a dozen household appliances on a single overloaded circuit. Double and triple sockets. Strange gadgets and make-shifts.

Has the Great American Home gone completely haywire?

It looks that way—in all too many cases. Contractors who have looked around know what a surprisingly large number of otherwise modern homes contain antiquated, haywire electrical installations.

What has happened? Who is to blame? Not the home owner. The electrical contractor? Partly, but not entirely. The big bad depression? Only partly.

Strange to say, the biggest cause of wiring inadequacy today is—*progress*! Progress has gotten ahead of home wiring.

One by one, new electrical appliances, new electrical conveniences have found their way into homes—*because people wanted them*. They are going to want more in the future. They want to keep up-to-date.

Result—the wiring installation that was ample to carry the load ten, or even five years ago, is inadequate today. The average home electrical load has grown enormously.

Never has the electrical contractor found himself face to face with a greater, more clear-cut opportunity. Reports from every side indicate the public is in more of a buying mood than at any time in years. But the public will not and can not buy wiring by itself. It must be shown—and sold. And it's up to the electrical contractor to do the selling.

Hint—it isn't hard to find an excuse to look at wiring in homes in your vicinity. Offer an inspection as a free service. You may be surprised to find yourself far more welcome than you expected.

Step two. Note the serious inadequacies, the inconveniences—possibly even, the electrical hazards—that may be present. Call them to the attention of the home owner. Sell him. But sell him convenience, comfort, safety—not just wire and outlets.

Step three. Don't stop there. You may know of lots of electrical improvements, new ideas, new conveniences and comforts. But, the chances are, your customer has never heard of them. Educate him. Bring him up to date. Tell him about built-in appliances, better lighting, future possibilities in all-year air condi-

tioning. Tell him—and sell him!

And when you do, sell him a quality job that won't come back to reproach you later. (If you can sell a "cheap" job, you can sell a quality job.) It will pay.

To Contractors who see their opportunity, and who are ready to go out and grasp it, Graybar offers its wholehearted support. Some of that support is represented by the dependability of electrical materials from Graybar. Let Graybar's 65 year old reputation for quality stand behind your own business reputation.

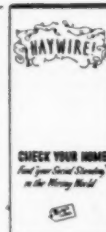


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OFFICES IN 73 PRINCIPAL CITIES

Contractors! You'll want to see this interesting booklet that describes home check-up suggestions in detail. We have a plan for distributing imprinted copies to your customers. Your name below brings you the details.

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electrical contracting

WITH WHICH IS CONSOLIDATED ELECTRICAL RECORD

JULY
1934

broken promises

by
JOHN
WISE



Al, Hank and Joe, sourdough prospectors of the old West, had been partners for years. One December night, after whooping it up in town, they hit the prairie trail at three A. M., headed for their shack. About a mile from home a blizzard caught them — a riproaring, snowshooting, sun-of-a-gun-on-wheels. Still woozy, they speeded up, but in five minutes the trail was blotted out and when they reached the spot where the shack should have reared its ugly roof, there was nothing. They circled till exhausted, then, thoroughly sobered and hopeless, sank down, back to back, to die.

"We're goners, pards," sobbed Al, "It's time to think of our sins. Me, I've gambled away everything I could get, mine and yours, all these years. You, Joe, ain't hardly drawn a sober breath since '49. Hank ain't no better; he cusses so much and so wicked he's driv' all our luck away. But we got one chance. Let's all promise the Lord and each other that if we get out of this alive we'll quit our bad habits forever." So they clasped numb hands together and solemnly swore to the compact.



Came the dawn, and when they struggled painfully out of the snow with hearts full of thanksgiving, lo and behold! there was the shack, glistening in the sunshine, only 100 feet away! You know the rest. At eight o'clock that evening Al was sitting in a game of dollar limit stud and Joe was drunker than a boiled owl, while outside the saloon, Hank poured a lurid stream of profanity into the quivering ears of a mule which had stepped on his foot.

The electrical contracting industry has also been in bad jams, time and again, and we knew every time that the only way out was through fair competition. We too were always Johnnie-on-the-spot with fervent promises of good behavior if we could only be rescued from our sea of troubles. Then, full-fed once more and sun-warmed, we promptly forgot our vows and reverted to the same old sins we had so nobly renounced.

What Al, Hank and Joe needed was someone to make 'em behave, but they had no check on their actions. The same was true of us in the past, but now the difference is that we're fitted with a set of four-wheel brakes which won't allow any skidding, namely, the NRA Code. We won't be able to lapse into our former habits and it's the best thing that ever happened to our industry. Every electrical contractor, large and small, must now do business as he wishes his competitor would.



Cost Factors Involved in Labor Rotation and Labor Shifts

By Ray Ashley

THERE seems to be some confusion as to just what is meant by the terms "rotation of labor," and "labor shifts." They both involve changes in the personnel of the men working on a particular job, but the reasons for making the changes and the methods of handling them are entirely different.

Rotation of labor in the electrical contracting industry is usually brought about by a shortage in construction work, and the purpose is to distribute the work among as many men as possible. One scheme is for two groups of men to take turns working alternate periods, usually of a week or two weeks' duration. Another scheme is to replace the men at the end of each period, with an entirely new group of men. Although a job might run for several weeks, none of the men laid off, would return to work a second period.

Labor shifts, on the other hand, are used to speed up work. In order to rush a job to completion, the work may be carried on sixteen hours a day. This is too long a period for a single group of men, so two groups are organized. After one group has worked eight hours, the second group comes on and finishes the day. In some cases the work goes on twenty-four hours a day, with three shifts.

Rotation has a very definite effect upon cost which however does not have to be excessive. One case, which will be discussed later, showed an increase of only approximately 3 per cent to 5 per cent in labor cost. In other cases, however, the contractors estimated their losses as high as 25 per cent on some jobs, and said that it was still higher on others.

The things affecting the increase in the job costs (materials and tools as well as labor), in the order of their importance, are:

- (1) Personnel of the workmen
- (2) Methods of rotation
- (3) Nature of the work
- (4) Size of the project

In giving weight to the importance of the above items, it was assumed that not over 80 per cent of the men working on a particular job, would be subject to rotation. In other words, if a project required one hundred electricians, twenty of them would be on the job permanently. Such men are called "key men" and consist of a general foreman, foremen and special men. The number of key men varies with conditions and localities. In some cases the key men have only represented 13 per cent of the working force. As yet no definite plans have been formulated for standardized rotation.

Personnel

In checking the effects of rotation, it was almost invariably found that on jobs where contractors were in a position to use men who belonged to what they considered their regular force, the increases in labor costs were much lower than where men were taken from relief forces.

In one case of conveyor wiring, involving a great deal of complicated wiring, about 20 per cent of the men were key men, and worked regularly. The remaining 80 per cent of the workmen were supplied from two groups that worked alternate weeks. The rotated men, as well as the key men, had all worked for the contractor before, were thoroughly familiar with his methods of handling work, and were accustomed to working together. When the work was completed, the labor costs were compared with those of a similar project, which had not rotated the labor. The increase was estimated to be between 3 per cent and 5 per cent.

Contrasted with this was a similar installation of wiring, on which the labor showed an increase of approximately 25 per cent due to rotation. In this case the men rotated had never worked together, and the majority of them had never worked for that particular contractor. With such conditions, the replacement of

men is very great. Some of them, it will be found, do not fit in the organization, and others will be going to work where there are better chances of permanent employment.

The success of any project, depends a great deal on the amount of interest taken by workmen. This interest is not going to be the same if men know that they are going to be unable to complete what they have started. Besides, every man has his own ideas about how work should be done and some may dislike taking up work which has not been started according to their liking. Few workmen take up a job which has been started by someone else, and carry it on with the same enthusiasm that they would carry on a job for which they are entirely responsible.

Also, there are always certain workmen who for one reason or another are never identified with any particular firm. The results of any contract depend a great deal on how many of these floaters have to be employed. The best kind of a contract can be utterly ruined if the job is loaded up with workmen of the wrong kind. Some contractors refuse to figure work which is to have rotation, due to the hazards.

Methods of Rotation

Some standard method for rotating labor should be established whereby the estimator could gage his figures. It should be flexible enough to allow the contractor to work to an advantage, and should be a case of division of labor rather than rotation. For example, let us take a contract which will require 10,000 man-hours labor, and an average crew of 25 men. Let us assume that the force is to consist of 5 key men, who work regularly, and 40 men who are to share the remainder of the work. The approximate division of time would be as follows:

5 key men	400 hours each	2,000 hours
40 men	200 hours each	8,000 "

Total 10,000 "

If the contractor's only restric-

Electrical Contracting, July, 1934

tions were that he was to divide this 8,000 hours among the 40 men, and that each was to have approximately the same number of hours each month, he would be able to replace men at convenient times.

A desirable method of rotation could be established by having the working force consist of two divisions—key men and rotated men, with the rotated men again separated into four groups. By having four groups, it would be possible to carry on the rotation without replacing all the men at one time. This method can be shown graphically.

The number of men in groups *a* and *b* would be the same, and the number in *c* and *d* would be the same, but the number of men in group *a* would not necessarily be the same as in group *b*. The division might be similar to this:

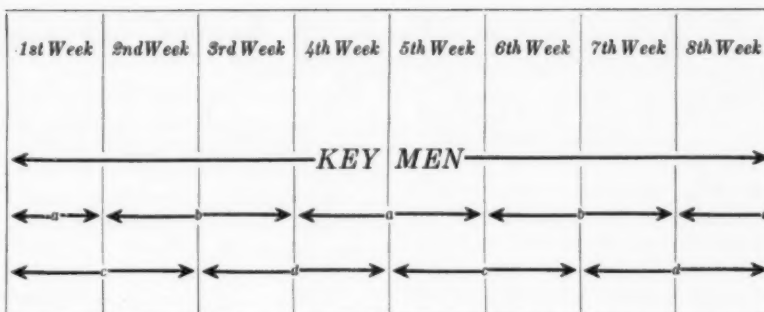
- Group *a*—12 men
- Group *b*—12 men
- Group *c*— 8 men
- Group *d*— 8 men

It might be well to have groups *a* and *b* change at regular intervals and use *c* and *d* to take care of the irregular changes.

There is always a certain amount of work which can be taken up by new men without loss of time. Pipe has to be cleaned, material handled, fixtures made up, etc. Some of the *a* and *b* group could be used for this work. Men usually work in pairs, and by having four groups, it is not necessary to change both men in a pair at the same time.

Nature of the Work

Any interruption of work or change in personnel costs money, and the more exacting or complicated the work, the more costly is the interruption. Fast moving jobs also suffer more from such changes, as the foremen have less time to acquaint the new men with all the details. In large concrete buildings, where the conduit is all concealed, it is much harder for a new crew to come on and take up the work, than it would be in a factory building where everything is exposed. One contractor, who has rotated labor on large concrete jobs, said that it was safer to start a new crew each time than to get back men who had been off for a week or so. The new men will listen to instructions and follow plans, whereas the men who have been on the job before will



Overlapping rotation using key men and four groups (*a*, *b*, *c*, *d*) of rotated men

have the erroneous idea that they know all about the layout.

A factory installation, where all of the work is exposed, should suffer very little from rotation. It is easy for the foreman to keep track of the work installed, easy for new men to see where the work has to be taken up, and there is a very good opportunity to complete each branch as the work goes along. When branch lighting conduit is installed, wire can be pulled in, fixtures hung and the entire branch wiring system completed. The new men coming on may often be absorbed in starting an entirely new branch of the work, such as setting and connecting motors, or pulling in feeders.

On concentrated work such as large transformer vaults, sub-stations, and switch-boards, there is also a possibility that the new men can come on the job and carry on the work without much loss of time. The work is all open and the foreman can readily detect mistakes.

Size of the Project

On large projects, under the best of conditions, a contractor has difficulty keeping in touch with all the details of the work. With rotation, many things can happen to add to the difficulties. Work can not always be installed as shown on the plans. A workman who finds it necessary to make changes, may neglect to tell the foreman. When it is time to pull in wire, the man who installed the conduit may not be on the job and there will be no accurate record of the work.

On big buildings, men do not have a chance to get as familiar with the work as they do on a small one. This adds to the cost of the work under ordinary conditions, and with labor being rotated, the addition of cost will be greater. The chances are also less of a group of men completing

any piece of work. On a small installation, one group may be able to complete certain floors or certain feeders before leaving the job. This not only simplifies things for the oncoming crew, but serves as an incentive for the workmen on the job.

Turnover of men is always serious. Two things increase the turnover on large projects—men leaving to take positions of a more permanent nature, and “misfits.”

Labor Shifts

Where more than one shift of workmen is employed on a job, there is always a decided increase in cost ranging from 20 per cent up. The reasons for this are many.

Night workmen never produce as much as men working days.

Supervision can not be as good. There is not the same interest in the work.

Delays are liable to result from not getting night delivery on material.

These are a few of the general causes. In addition, where three shifts are employed, very often two of the shifts work only seven hours but get paid for eight.

The things determining the amount of increase are practically the same as listed for rotation, namely: Personnel of the workmen, nature of the work, method of shifting and size of the project.

The method of shifting may vary a great deal, depending on the number of shifts, hours per shift, etc. There may be two or three shifts and the working time may be six, eight or ten hours per shift. In any event, the contractor may gain by having some of the shifts overlap. In the case of three shifts, the regular periods are usually:

- 1st shift— 8:00 A.M. to 4:00 P.M.
- 2nd “ — 4:00 P.M. to 12:00 Midnight
- 3rd “ — 12:00 M. to 8:00 A.M.

Instead of all of the men following this schedule, a portion could follow an intermediate schedule, such as:

Shift 1A—12:30 Noon to 8:30 P.M.
 " 2A—8:30 P.M. to 4:30 A.M.
 " 3A—4:30 A.M. to 12:30 Noon

The group following the intermediate schedule would not necessarily have to be the same number as the group following the regular schedule. They could be key men, who would act as connecting links between the various groups.

Throughout this discussion, consideration has been limited to the increase in the labor cost only. Although labor cost is the major factor, the increase in superintendence costs and the possible increase in the tool and material costs should not be overlooked.

Every time a shift changes, a certain amount of time will have to be used aiding some of the new crew in picking up the work where it was left off by the preceding shift. The additional supervision does not stop here, for experience has shown that work which would ordinarily proceed without supervision has to be watched continually. There is more or less confusion about payrolls and time records, which have to be straightened out.

On small open jobs, material and tool losses should not be great, but anyone with experience knows that changing men on a large job results in certain losses. If the men are inclined to be careless the losses may be

very large. In some cases many tools and much material have been buried in the concrete.

The cost of engineering must also be considered. Either rotation or labor shifts require more detailed plans and shop drawings. In addition to the ordinary floor plans, many small plans of sections of the job have to be drawn up.

Pages might be written, and volumes of data compiled, but no contractor can appreciate just what these two forms of handling labor involve, until he has had experience. There seems to be one thing definitely settled and that is that rotation for keeping an organization of desirable men together is one thing and rotation for relief is another.

POWER COMPANY PROMOTES WIRING FOR CONTRACTORS

An advertising campaign for the benefit of the electrical contractors in fifteen districts or division points in Minnesota, Wisconsin and Fargo, N. D., is being conducted by the Northern States Power Company. Working with the power companies in the promotion of this campaign is the Minnesota Electrical Council of which William A. Ritt is secretary-manager.

The campaign consists of five newspaper advertisements, three of which are reproduced on this page, which the company will pay for. Each piece of copy carries the slogan, "Your electrical contractor is ready to serve you," as well as the names of the cooperating contractors. The contractor's part in this program consists of sending a letter, which the company will multigraph for him, to a selected list of customers. The letters will be mailed in batches of 10

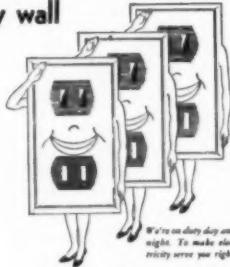
and the contractor will then call on each of these 10 to offer his services or solicit new business on wiring, repairs or appliance sales.

The company will assign a man in each district to work out the details with the contractors locally, and the Minnesota Electrical Council will follow up the operation of this campaign from its office in Minneapolis.

The only cost to the contractors in this campaign will be for stationery and postage, plus the time that is spent in making these calls. Such a campaign was conducted experimentally at Faribault just before the bank holiday last year. The contractors there made a total of 22 calls, resulting in an average sale of \$5.61 per call.

If this activity proves successful for the contractors, the company has indicated its willingness to consider more activities of this sort.

Put an ELECTRIC OUTLET on every wall



We're on duty day and night. To make electricity serve you right!

NOW is the time to install extra electric outlets in your home. Prices are low, and you'll get a workmanlike, efficient job.

Electric outlets make electricity convenient. They save you the trouble of reaching and stretching for overhead connections. They make every room safer and more orderly by eliminating unsightly cords throughout the house. And they can easily be installed without fuss or mess.

Your electric contractor will gladly give you prices on one or more outlets, or on any additional wiring your home may need. Phone him now. Nothing can make your home more truly modern and livable than adequate electric wiring. It is to your advantage to install wiring now. Northern States Power Company.

YOUR ELECTRICAL CONTRACTOR IS READY TO SERVE YOU.

This Advertisement is Published in Co-Operation with the Following Electric Contractors:



ARE YOU GETTING FULL VALUE from your HOME?



In these days the home is being used more than ever before. Full use of electricity will add immeasurably to the convenience of YOUR home and in very little cost. If your home does not include the following conveniences your electric contractor can install any of them easily and cheaply.

✓ Check Over the List and Then Call Your Electrical Dealer For a FREE Estimate

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 For beds, bedrooms, etc.
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 KITCHEN LIGHT
 Modern illuminated work space.
 ELECTRIC CLOCK
 Shows your correct time.
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 Especially for the kitchen and bathroom.
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 You sit on the sofa reading.
 GUEST SECRET
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 DISCOUNT REFRIGERATOR
 Discounted prices.
 YARD LIGHTS
 Your own path.
 GARAGE LIGHTS
 With a switch in the house.
 PORTABLE LIGHTS
 For garage, basement or attic.
 CAR SEATERS
 Make all your drives.

This Advertisement is Published in Co-Operation with the Following Electric Contractors:

Your ELECTRICAL CONTRACTOR is Ready to Serve you

WHETHER it's a complete wiring job or only an extra convenience outlet, your electric contractor is equipped to serve you better than ever before! He is a skilled craftsman—a man of experience and specialized knowledge in his craft. If you have any electric appliances, wall plugs, switches or lighting fixtures that need repairing NOW is the time to have it done. Have short-circuits, overloaded lines, frayed wires, or loose connections—all to save you money and give you greater value. It costs little to have appliances or wiring repaired. And new outlets or fixtures can easily be installed without fuss or mess. Please your electric contractor today. He will gladly advise you and give you estimated prices on any electric wiring or repairing you may need.

This advertisement is published in co-operation with the following electric contractors:

Code Rulings and Explanations

Issued by Electrical Contractors' Code Authority

Definitions of Skilled Worker

The term "skilled electrical worker" as used in the Electrical Contractors' Code of Fair Competition means any electrical worker sufficiently skilled to be employed to do electrical work on his own responsibility and without supervision.

Employers in Towns Under 2500 Population

It was stated in this publication last month in answer to an inquiry by a contractor that members of the industry who were located in towns of less than 2500 population were exempt from the provisions of the code. This was an error. All members of the industry have to conform to the code irrespective of the size of the town in which they may operate. The only exception that is made for those operating in towns of less than 2500 population is found in Section 2-B, 3 of Chapter 1 wherein employees in establishments employing not more than two persons in towns of less than 2500 population are exempted from the provisions regulating the maximum number of hours an employee may work.

No Provision for Overtime

In the last issue of this publication in reply to a question raised by a contractor it was stated that overtime should be paid on the basis of time and a half. This is not correct. The theory of the Recovery Act does not contemplate overtime and, therefore, no provision for overtime is made in the code.

Five Dollar Pledge Voluntary

I live in a town of 1,000 population. I am the only electrician living in village and have few contract jobs. My work is mostly labor and materials. Do I come under the code?

I also received a pledge from the Electrical Contractors' Code Authority, 420 Lexington Ave., New York City, asking me to send them a check for \$5.00, also to sign the pledge. Is this a law and am I obliged to send

them \$5.00 and sign same? Is there a law that can force me to?

If you are in the contracting business or performing the work of the same, you are subject to the regulations of the Code.

Up to the present writing there is no law that will compel you to pay the five dollars. It is purely voluntary and your notice so stated. As soon as the budget is approved, then any assessments levied will become a law.

Small Town Operator

As a subscriber we would like to know if there are any "teeth" in the electrical contracting code. What is the penalty for violation?

We run a small shop in a town of less than 1500 population. We average about one hundred dollars net from our contracting operations per

year. By being in all phases of the electrical industry we manage to eke out a livelihood.

We have a young man helping us who is learning the trade. To have to pay him the minimum wage specified in the code would mean that we will have to discharge him which act neither he nor we desire to happen.

Analyze this situation for us? Also is working on a job time and material a violation of the code?

The teeth of the code are in the National Recovery Act which fixes penalties of up to \$500 for each act and/or imprisonment.

Everybody in the industry is subjected to the regulations of the code. The minimum wage for unskilled workers is 40 cents an hour and applies to all members of the industry.

Time and material work is not a violation of the code.

Code Authority Issues Statement

To the Members of the Electrical Contracting Industry:

It is gratifying and encouraging to receive such support from so great a number of electrical contractors in the organization of code administrative bodies. It is appreciated by the code authority and we have confidence that with the good work that has been started the results will be of great value to the entire industry.

We also wish to thank the many members of the industry for their kind contribution of \$5.00 as a preliminary payment for the support of the Code subject to the approval of the budget. While it has assisted materially, we can use a great deal more of the same kind of support. We believe that all electrical contractors are willing to support the Code because of the immediate effect it will have on the industry and, therefore, that they should participate in the expense necessary for its administration. If you have not sent in your contribution, we would indeed appreciate your kind consideration in sending it in immediately.

There has been a very large sum of money expended by the National Electrical Contractors Association in the promotion of the Code as an industry proposition and I am sure that you will want to assist in supporting the same.

If there are any localities that are not organized as yet and are desirous of getting information about the formation of local administrative committees, an inquiry will bring the desired information promptly. All members of the industry have this privilege and we want them to take advantage of it.

If we will all pull together, the electrical contracting industry can develop one of the best and most efficient administrative bodies in the United States in the enforcement of the Code and with the goodwill of our industry we are bound to make our Code a great success.

L. E. Mayer, Chairman
Electrical Contractors' Code Authority

Electrical Contracting, July, 1934

Wiring of 80 Kilowatt Home

By H. S. Gano
Appliance Engineer
Westinghouse Electric Manufacturing Co.
Mansfield, Ohio

THE Westinghouse Experimental Home, with its 80 kilowatts of connected load, presented certain problems in wiring not encountered in the average seven room house. The connected load of 80 kilowatts was divided into 27 kilowatts in the basement, 33 kilowatts on the first floor, 8 kilowatts on the second floor, and 12 kilowatts in the sun room. However, as usual, the load concentration was found to center around the kitchen, laundry, and basement, which together had a connected load of 45 kilowatts.

The "tree" method of wiring was finally decided upon with feeds and branches as follows:

The main service consisting of a 3-conductor No. 4/0 lead covered

cable was brought underground from the pole to the apparatus room through a disconnect and metering transformer cabinet. The current transformer was connected together with potential leads to an outdoor type meter located at the rear of the house. From the disconnect cabinet the service connected to a bank of three breakers located in the apparatus room.

A 100 amp. breaker fed the basement and kitchen, a 70 amp. breaker the sun room and another 70 amp. unit the remainder of the house.

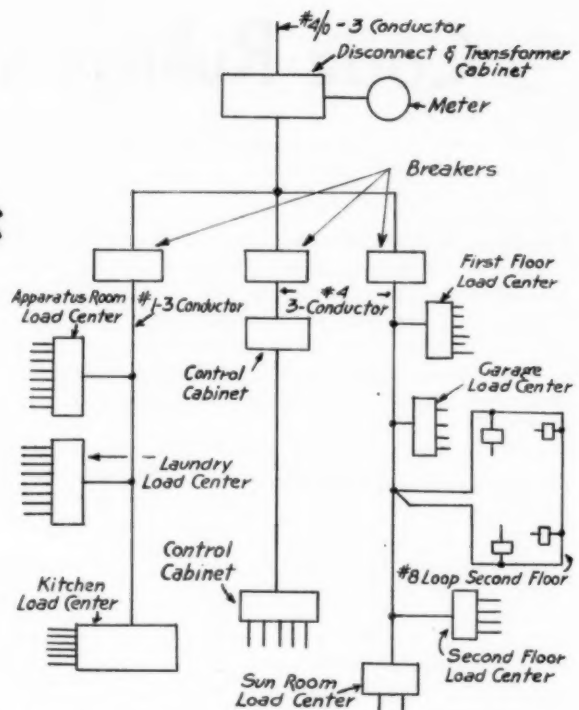


Fig. 1. Schematic Wiring Diagram

Three No. 1 conductors were run from the 100 amp. breaker. Tapped on this circuit are an 8-circuit load center in the apparatus room, a similar one in the laundry and a 6-circuit unit in the kitchen. Branch circuits were then run from these load centers.

Three No. 4 conductors were run from the second breaker to the sun room control panel in the basement and from there to the sun room where the individual banks of paneled heaters were controlled.

Three No. 4 conductors were taken from the third breaker to the third floor. On this are tapped a 6-circuit load center at the first floor, a 4-circuit load center in the garage, a 4-circuit load center on the second floor and a 2-circuit load center in the sun room. In addition, a miniature network was tapped to this riser consisting of a No. 8 closed loop, which fed two rooms on the second floor.

Inasmuch as the No. 8 had half of the current carrying capacity of the No. 4, and inasmuch as it was a closed loop consisting in reality of two No. 8 wires in parallel, which would have the same current carrying capacity as the No. 4 riser, no protection is provided at the point of tapping. At various points on this No. 8 loop switching and protection was pro-

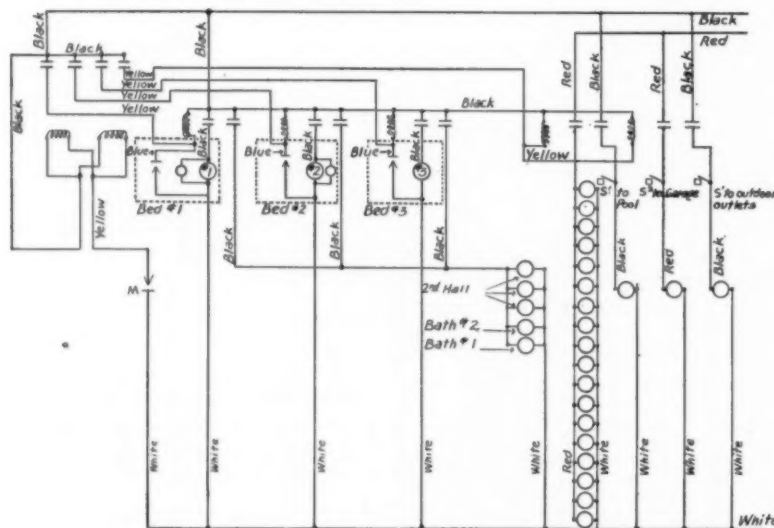


Fig. 2. Burglar and Night Light Wiring Control

vided for the final branch circuits in the individual rooms, to lessen inconvenience in restoring service when interrupted by overload. The wiring diagram, Fig. 1, shows the general scheme used.

One of the interesting features was the scheme (Fig. 2) of combining night and burglar lights. The individual lights consisted of a rectangular 25-watt unit mounted about 6 in. above the floor to give a subdued light within the room. Twenty-six of these units are located throughout the house and garage. All of these lights are controlled by a master switch located in the master bedroom. The lights located in the bedrooms, second floor baths and hall also act as night lights.

The control is such that the hall and bath lights may be controlled from each bedroom together with the lights of that particular bedroom. Thus, if the night lights for bedroom No. 1 are desired a small pendant switch is pressed and the night lights of that room together with the lights in the hall and bath are turned on. Interlocking was worked out so that when the master switch was turned on all bedroom, hall and bath night lights together with the remainder of the burglar lights are locked in and cannot be turned out except by the master switch. All wiring for this system is concealed and the control is in a locked cabinet fed directly from the service conductor so that the entire

system is inaccessible and only controllable from the master station.

Concealed knob and tube wiring was used throughout except where it was necessary for the wiring to be exposed in the basement, which was done in conduit.

Altogether a total of $3\frac{1}{4}$ miles of wire ranging in size from 3-conductor No. 4/0 to No. 18 single conductor was installed. A study of the probable maximum demand indicated that much smaller copper might be used for the service and sub feeds. However, in view of several major appliances which draw heavy loads it was deemed advisable to use larger copper in order to avoid voltage drop and to eliminate insofar as possible unnecessary flickering of the lights.

Wiring for the New Two-Element Three-Light Lamps

By James Paul Warner
Consulting Electrical Engineer
Pittsburgh, Pa.

AS long as users of the new two-element three-light lamps are satisfied with individual pull-cord control on either ceiling pull or canopy switches, no particular wiring problems are encountered. When, however, control moves off the ceiling to the wall or panel a consideration of the wiring system is necessary.

In present buildings, if the wiring method is concealed knob and tube or armored cable, a tear-up of the building will probably be necessary. If the wiring method is conduit, it may be possible to withdraw the present wires and replace them with the proper number, provided of course that the size of conduit will accommodate the necessary wires. Only investigation will show whether the desired change is possible.

On the other hand, when one faces the problem of wiring a new building for two-element lamps, he is freer to carry out a design of control that is

nearer the ideal of adequacy and convenience. The designs presented here are based on the avoidance of a difference of potential between the ring and tip contact. In other words, the shell or grounded contact does not serve as a common neutral for a 115-230 volt, 3-wire system with one outside connected to the tip and the other

to the ring contact; nor does the shell serve as a common neutral for a 115-200 volt, 3-phase, 4-wire system with one of the phase wires connected to the tip and another to the ring contact.

No difficulties should be encountered in using a 115-volt, 2-wire system, as all that is necessary is to always connect the shell to the white or grounded wire.

If a 115-230 volt, single-phase, 3-wire system is used with local control, the only precaution necessary is to be sure that both switches for one lamp are connected to the same circuit. A suitable arrangement is shown in Fig. 1. If wires are color coded as indicated, no testing out will be necessary.

In arranging local switches for two-filament lamp control, two small switches of the type recently introduced by one of the wiring device

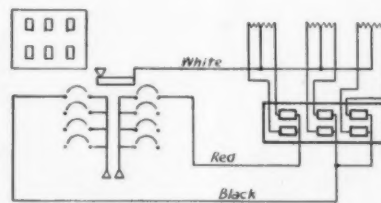


Fig. 1. Local control from a 115-230 v. 3-wire system showing panel connections with common neutral for two circuits and control for three lamps from six switches mounted either in three or six gangs.

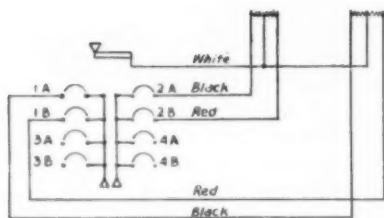


Fig. 2. Panel control from a 115-230 v., 3-wire system using common neutral for two circuits.

manufacturers could be used in one gang or plate, or two switches of ordinary type could be used, one above the other, if capacities demanded the larger size switch. It will be desirable to wire uniformly top row of switches to large filaments and bottom row to small filaments.

If panel-board control is desired from a 115-230 volt, single-phase, 3-wire system, the connections could be arranged as in Fig. 2. The panel-

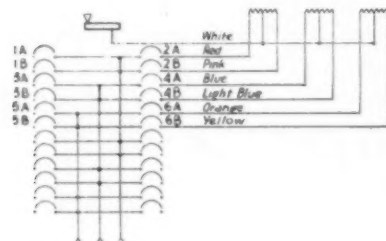


Fig. 3. Panel control from a 115-200 v., 3-phase, 4-wire system using common neutral for three circuits.

board could be ordered numbered as indicated, or renumbered.

Where 115-200 volt, 3-phase, 4-wire systems are encountered, as in some metropolitan districts, and where it is necessary to keep loads balanced on one or more panels, wiring and panel connections could be

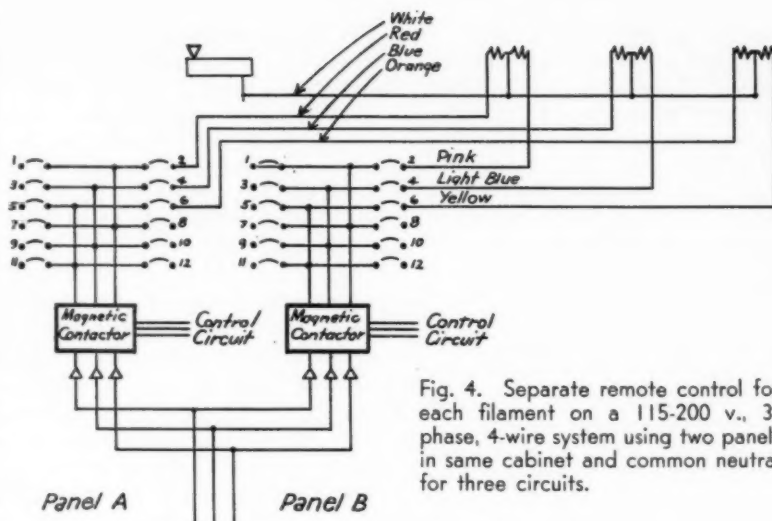


Fig. 4. Separate remote control for each filament on a 115-200 v., 3-phase, 4-wire system using two panels in same cabinet and common neutral for three circuits.

arranged as in Fig. 3. Color coding of wires from such a panel would be almost necessary.

In case separate remote control of each intensity is desired, the panel could be divided and the wiring ar-

ranged as indicated above in Fig. 4.

The wiring schemes here suggested are in accordance with good engineering practice and no National Electrical Code violations are known to exist in them.

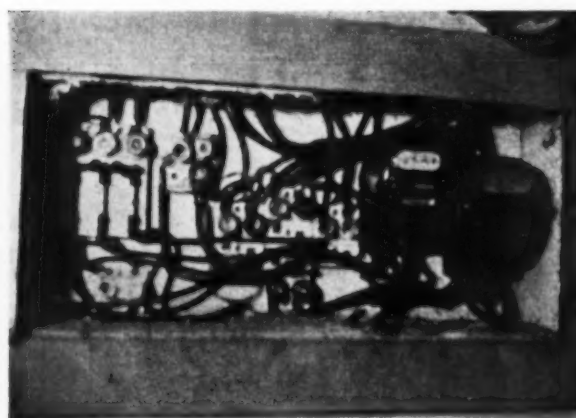
HIGHER INSURANCE FORCES DEFECTIVE WIRING CORRECTION

The accompanying photographs show the "Before" and "After" character of a bank of meters serving the Leuco Lloyd-Pritchard Buildings in Chapel Hill, N. C.

The incoming service, metering panels and branch circuits were condemned several times by the local inspector and also by the local power company. The owners took no action in the matter until the Southeastern Underwriter's Inspector, C. R. Brooker, likewise condemned the wiring and the insurance rate on the buildings was boosted 25 percent. Then the owners had the wiring changed.

The original wiring had a wooden box built in the wall to house fuse panel and a three-pole knife switch for master branch circuits which in turn were fused from porcelain fuse blocks set at random in box. Meter loops were loomed to meters set outside box. Seven meters measured the various loads for the two buildings, the connected load of which was about 9 kw.

In the modernized job, which used Square D equipment, the larger master switch was used to take care of any future load that might be added. The new meter installation was set on a board panel painted gray—metal and conduit work being painted black.



Motor Repair Shops Seek Code

UNDER the sponsorship of the National Motor Section, N.E.C.A., operators of motor repair and electric service shops are seeking to secure code regulation through amendments to the Electrical Contractors' Code.

A first draft of proposed amendments was submitted to N.E.C.A. motor shop members and as a result of the suggestions received a revised draft has been prepared and submitted to the service shop industry. The section asks that all service shops sign and return the certificate.

Two things stand out in these amendments, which are given on this page. In the first place, the industry does not intend to exclude from the provisions of the code any repair shops operated by manufacturers where other equipment than that made by that manufacturer is repaired.

In the second place, the industry finds that its labor provisions must be different from those in electrical construction. Since the men in the repair industry are not subject to the fluctuating employment conditions

that exist with construction work the wage bases are lower. Also the character of the work makes it necessary to work overtime in emergencies on work that cannot be left unfinished. These conditions are recognized in the proposed amendments.

The proposed amendments to Chapter VI of the Code of Fair Competition for the electrical contracting division of the construction industry to cover electrical repair and service shops follows (italics show the new material):

AMEND SECTION 1 OF ARTICLE I to read as follows:

"The term 'Electrical Contracting Division' or 'this Division' as used herein is defined to mean the erecting, installing, altering, repairing, servicing, or maintaining electric wiring, devices, appliances, or equipment, including the purchasing from suppliers and the selling of manufactured parts and products incorporated in such installation, and including such related subdivisions thereof as may be hereinafter defined, provided that:"

ADD A NEW SECTION 3 TO ARTICLE I to read as follows:

"The term 'Electric Repair and Service Shop Subdivision' as used herein is defined to mean establishments engaged in the repairing, rewinding, reconditioning, servicing, maintaining, rental and sale of electric motors, generators, transformers and other electric apparatus and appliances, and the processing of products incorporated therein, and such mechanical repairs and servicing as are incidental thereto."

AMEND SUBPARAGRAPH (d) SECTION 1 OF ARTICLE I to read as follows:

"(d) The provisions of this Chapter shall not apply to manufacturing or assembling in the manufacturer's plant, nor to servicing or repairing by a manufacturer of electrical apparatus, appliances or equipment of his own manufacture, except where such manufacturer operates a service and repair shop for the purpose of servicing or repairing other makes of electrical apparatus, appliances or equipment besides his own in competition with other service and repair shops but the provisions of this Chapter shall apply to the installation of all new electrical work done by such manufacturer on the customers premises not elsewhere excluded in this Section."

STRIKE OUT THE FOLLOWING SUBPARAGRAPH:

"An electric repair shop, for the purpose of this paragraph, shall mean an establishment engaged in the repairing, rewinding and reconditioning of motors, generators, transformers and other electrical apparatus."

AMEND ARTICLE II—Hours, Wages and Conditions of Employment; by renumbering present Section 12 to read

Electrical Contracting, July, 1934

Section 15 and insert three new Sections 12, 13 and 14 as follows:

"Section 12. The provisions of Section 1 and Section 3 of this Article II shall not apply to the hours, wages and conditions of employment of employees engaged in the Electric Repair and Service Shops Subdivision.

"Section 13. The minimum wage that shall be paid by any employer to any employee engaged in the processing of products, or in repairing and servicing work, within the Electric Repair and Service Shop Subdivision, shall be 40c per hour, provided that learners may be paid not less than 80% of this minimum rate paid, but the number of learners receiving less than such minimum rate shall not exceed 5% of the total number of employees, except that there may be a minimum of one learner per shop."

"Section 14. (a) The maximum hours fixed in Section 2B of Article III of Chapter I of this Code shall not apply within the Electric Repair and Service Shops Subdivision to any employee on emergency maintenance or emergency repair work involving break-downs or protection of life or property, or to any specially skilled employee in emergencies occasioned by the necessity for services of such employee which cannot be cared for by the employment of additional men. In any such case at least one and one-half times the regular rate shall be paid to employees for time worked in excess of the maximum provided in Section 2B of Article III of Chapter I.

"(b) The maximum hours fixed in Section 2B of Article III of Chapter I of this Code shall not apply within the Electric Repair and Service Shops Subdivision for six (6) weeks in any twenty-six (26) weeks, during which overtime shall not exceed eight (8) hours in any one week. In any such case at least one and one-half (1½) times the regular rate shall be paid to each employee for time worked in excess of forty (40) hours per week or in excess of the eight (8) hours in any twenty-four (24) hour period."

Averages Over 75 Gas-Station Jobs a Month

IN the past three years the Gamp Electric Company of St. Louis has built up a business in gasoline filling station wiring that last year amounted to almost a thousand jobs, new and remodeled.

This company, up until 1929, had been engaged principally in large construction work when, foreseeing a drastic falling off in building construction it began to switch to smaller work that had a repeat angle. This led to specialty wiring that provided an opportunity for service work and maintenance.

The first field to be cultivated was oil-burner and refrigerator installations. Now twelve men are employed with the gasoline filling station work providing the major portion of the volume.

In the development of this latter class of business a definite plan was followed for (1) the approach, (2) an offer of specific inducements, (3) a presentation of evidence to visualize these inducements, (4) segregation of this specialty for efficient and speedy installations, and (5) a system of service and follow-up contacts to strengthen relations. The in-

formation necessary to perfect this plan was obtained by means of preliminary inspections and judicious inquiries which furnished a rough idea of the requirements and methods of the oil companies.

The hardest thing in planning the first approach was to determine the right man or men to see. In large organizations the usual set-up is as follows: The advertising department for signs; the construction department for new installations and major remodeling; the retail or service-station department for minor repairs, pump changes, etc., and the mechanical department for major repairs. Under these conditions it was quickly learned that the easiest way to get headed right was to see the district manager first.

This being settled, the next question was the story to be told the respective buyers. In the case of Gamp Electric Co., it ran something like this: "We want to do your work. We offer you adequate, efficient installations, quality material and fast service, with methods and prices that will save you money, time and trouble. We can do this because



George L. Gamp

of careful preparation for your type of work.

"As evidence in support of the foregoing claims, here are our references, outstanding firms which will testify in answer to any questions you care to ask. Here also are photographs of our special trucks and equipment. When our men go on the job for you they carry in these trucks everything necessary to complete the work without delays or substitutions. You can see our tools are up-to-date and the best we can buy. In addition, our men are thoroughly trained in specialty wiring. Right now, those who have not done your type of work are studying it and careful supervision on the job will complete their knowledge.

"The cost of labor is important to you. You pay a maintenance man a third as much per hour as we charge you, but you pay him continuously; we charge you only for the actual time involved in each operation. Also, since our men are always busy, there is no danger of sloppy work or loafing through discouragement or indifference. All this we will back up with close contact, cooperation and intensive study of your problems."

This definite, cards-on-the-table type of sales talk succeeded and a few remodeling jobs were secured, as a sort of demonstration, and to set a standard. These brought contracts for new stations, which, in turn, made older installations obsolete and created more new jobs. The very



One of the jobs on which the wiring was designed and installed by Gamp. It has underground sub-station, super-flood lights, 2500 ft. of Neon tubing and the largest two-faced sign in St. Louis.

nature of the gas-station business, serving as it does a vast and critical public, calls for constant change and improvement.

Lighting, and particularly flood-lighting, requirements vary greatly depending upon neighborhood and surrounding lighting, therefore the Gamp men had to study each individual layout for conditions which necessitated departure from set standards. The working hours also influence the lighting plan materially, as do the size and type of station and the height and proximity of surrounding structures.

Takes Light Readings

In arriving at the exact amount of light needed, without either waste or skimping, guesswork is barred. Gamp Electric Co. assists the construction department of the oil company by taking readings with a foot-candle meter in as many as 10 or 15 different spots in the station area; they have kept one man busy at this work for months at a time. The reader makes a graph right on the job. This graph shows the intensity of the various spots and enables the engineer to make sensible and accurate recommendations.

Pump wiring is important, in both remodeling and new work. Hand pumps are constantly being replaced with motorized units. Illuminated station signs are being installed daily. They require special knowledge and service and run into substantial volume. Connecting battery chargers is another item. They are being installed as fast as the demand arises in various stations. Then there are the many small repair jobs, slight changes, adjustments, etc., which come under the head of maintenance and provide a fine lucrative call back business.

Factors in Securing Business

Outstanding factors in securing and retaining the large amount of business enjoyed by Gamp Electric Co. from these sources are as follows:

MECHANICS. The company wiremen show a high average of punctuality, courtesy and neatness. The special training in station work was given them on the job, by going over it and pointing out faults and omissions. There was no "bawling-out," only friendly correction and advice; the man who didn't measure up auto-



The auto-fleet that gives quick service. There are two 1½-ton trucks completely equipped with tools and material, a ½-ton truck and two coupes.

matically transferred himself to lesser operations. There has been little of this turnover, since the Gamp policy insists that a man have the "makings" of a real mechanic before being selected.

The men are made to feel that they are important members of the organization, and are encouraged to show initiative. For instance, if a man goes out to do a job, and sees any other electrical item damaged or not functioning properly, he calls attention to it and does what is necessary, thus saving inconvenience and additional expense. To give them a wider knowledge of products and applications, the company has gone so far as to have all twelve men at a meeting with wholesalers' and manufacturers' representatives.

EQUIPMENT. Tools, large and small, are kept up-to-the-minute in style, condition and availability. Hammers, drills, benders, etc., are provided to expedite the work. An adequate stock is maintained at all times and future demands anticipated by seeking and testing new products and improvements. For transportation, a 1½ ton truck is assigned exclusively to station jobs, and is always loaded with everything necessary. This truck is backed up by four other cars in the fleet, a duplicate of the above, a ½ ton job and two coupes.

SERVICE. "Not over 60 minutes," is the slogan for any call in the city where it is possible to get there safely in that time, and this record has been maintained. In fact, most rush calls are answered in less than half an hour. Close telephone contact with the men at all times enables the office to direct their movements intelligently.

CONTACT. In addition to the routine and mechanical activities listed

above, there is the very important system of sales visits, follow-up and inspection calls, correspondence and the submission of proposals. These can undoubtedly make or break the building of a satisfactory volume. George L. Gamp, who handles the sales and supervision of this specialty, frankly admits it is a large order, and that he had to learn a lot of new angles, especially during the first year.

Study Station Operation

"For the electrical contractor going into this class of work," says Mr. Gamp, "the most important requirement, after good wiring, is to study the actual physical operation of the stations just as hard as if he were in that game himself. This will keep him 'on the wing' most of the time, with plenty of complications to wrestle with. Regardless of how smoothly his organization functions, he must not only sell the work but keep it sold by continuous effort. When he knows the problems well enough to put himself in the customer's place and speak his language, he is getting somewhere in a pleasant and interesting type of electrical work."

As to net results, Gamp Electric Co. completed 927 jobs, large and small, in 1933, with remodeling, of course, predominating. This total does not include petty service calls and adjustments. They have done work for six different oil companies and have submitted as high as 40 proposals in one day. They designed and installed all the electrical work on one giant station in St. Louis, including an underground sub-station and the largest "two-faced" sign in the city, lighted by 4,460 lamps. All of which indicates that gas-station wiring, properly handled, is well worth while.

electrical contracting

With which is consolidated Electrical Record

S. B. WILLIAMS, Editor

INDUSTRIAL WORK AND THE CODE

AT a recent meeting of inspectors a disinterested party made the statement that the contractors in a certain city were going to use the code to force hotels and other big buildings to use the services of an electrical contractor instead of employing a maintenance man.

Anyone who has studied the electrical contractors' code realizes that there can be little justification for such a statement. The code specifically exempts such maintenance men from the operations of the code provided they are continuously and regularly employed by the owner or the tenant of the building and provided, of course, they are not engaged in new construction.

Moreover, there is nothing in the code to prevent these same maintenance men from doing new work provided they conform to the requirements of the code while so engaged, i.e., 75 cents an hour minimum, 40 hours a week maximum, not more than one helper to each three electricians, or such other conditions as may be developed in that particular area.

Where a management company has been operating a number of buildings, using a central maintenance crew, the code does bring about a change. Either the owner or tenant of each building must employ his own electrical men for a period of at least six months or else the work must be done as regular electrical construction work, i.e., in conformity with the labor provisions of the code.

Under such conditions it is quite possible that the electrical contractors have an opportunity to regain much of that business, not through using force, but by demonstrating the economy.

Maintenance men have been employed by large buildings very largely because of lower

wages and a discount on supplies. If the difference in wages is eliminated for a large part of the work the seeming savings vanish. It is much less expensive in the long run to hire contractors to do certain jobs than to employ men the year around to take care of things only as they arise.

Now, if the manufacturers and wholesalers will give the contractor an adequate differential on this class of business, it will not be long before it will again come back into the fold and be a source of profit to everybody including the customer.

RANGE WIRING

TWO years ago we urged the several branches of the electrical industry to try through joint committee action to reach a decision on standard range wiring hook-ups. A joint committee was appointed but it never functioned.

The result is that today several power companies each working alone, are working out their own methods of installation. The contractors in each instance are finding their work reduced to a fraction of what it formerly was.

The utilities are insistent upon bringing down the price of range wiring. They are tackling the problem in many ways, the most prominent of which at the moment being the absorption of a certain portion of the costs through ownership.

In other words, these new plans more and more include utility ownership of service equipment.

Surely, there must be some way in which those interested can sit down in a joint committee meeting and produce a satisfactory standard or standards. If the utilities are the only ones to try to work this out the contractors can be certain that their interests will receive little or no consideration.

HOUSE CONSTRUCTION

THE administration is placing great hopes in the results to be achieved through the operations of the housing bill signed in the closing sessions of Congress. Through widespread publicity every effort will be made to coax private capital back into the construction business, particularly the financing of new house construction.

Although somewhat belated, the administration has come to understand that the de-

pression is largely a matter of unemployment in capital goods industries, the most important of which is construction. It is realized that the government can do little to improve conditions permanently through the expenditure of its own money in federal construction. All of its efforts from this point on will be concentrated on encouraging the investment of private capital in construction. The government insurance features of such investment should prove attractive to many investors.

The effects of this bill will probably first be felt in the small work of remodeling homes. It will take a little time to convince the public generally that it can, with safety, engage in what is generally the largest single investment of the average individual, namely, home building. Since, however, the government will insure mortgages up to 80 per cent of the appraised value and since these mortgages will have 20 years to run, it would seem reasonable to suppose that the government would have little difficulty in finding enough people to take advantage of this opportunity.

NATIONAL AND STATE RECOVERY CODES

AN interesting case has been decided in Utah by the State Board of Review in connection with a protest on the part of the utilities against being included under the contractors' State Code of Fair Competition either with respect to the repairing of appliances, or wages for the installation of wiring.

The board ruled that the contractors' code could not include in its definition of the industry a scope of operation greater than that normally enjoyed and so recommended that utilities be excluded from the operations of the code insofar as appliance repairs were concerned. The board further recommended that utilities be excluded from the wage provisions on wiring in cities too small to have an electrical contractor.

In this latter connection it would seem that such an interpretation of the State Code would be in conflict with the National Code which distinctly states that everybody engaged in the installation of new wiring work shall abide by the provisions of the Code. The only exception for small cities relates to the exception from the maximum number of hours that may be worked where an employer has not more than two employees and the population of the city is less than 2500.

Many states now have State recovery acts. These acts have been passed for the purpose of facilitating the operations of the National Recovery Act. Where codes under them, or any interpretation of them, are in conflict with a national code approved by the Administration and signed by the President it will be found that the national code will prevail, unless the State Code shall have imposed more stringent regulations when they shall prevail. In Utah, for instance, the 80-cent an hour minimum wage for skilled electrical workers, being more stringent than the national 75-cent minimum, the former will in all probability prevail in that state.

FIRE LOSSES

THE latest figures issued by the National Board of Fire Underwriters covering fire losses which came out a few months ago showed a decided drop in the 1932 fire loss from electrical causes over the preceding two years. The figures for 1933 will not be available until next January.

The losses listed under "Misuse of Electricity" were as follows:

1930.....	\$19,965,156
1931.....	17,083,983
1932.....	14,853,943

Undoubtedly a certain amount of this decrease is due to the lessened use of electricity by industrials and office buildings. Not only were there fewer opportunities for fires of this nature due to shut-downs and vacancies but premises that had inadequate wiring did not place the demand on such wiring as they would have under normal conditions.

On the other hand, the amount of illegal wiring had increased and the number of fires reported by some cities was larger. For that reason the only satisfactory answer for the lessened fire loss seems to lie in lowered property values.

In 1933 property values ceased to decline while industrial demand was quickened. The 1933 figures, and those for subsequent years, should reflect that situation with mounting figures from electrical fire losses.

Much of this waste can be eliminated through reinspection and adequate inspection forces. While the public and the fire insurance companies are thus gaining, the electrical industry would also be gaining through greater sales of replacement equipment and supplies, more installation work and better energy sales.

\\ code chats ///

A MONTHLY DISCUSSION OF WIRING PRACTICE AND QUESTIONS OF INTERPRETATION, PRESENTED WITH A VIEW TOWARD ENCOURAGING A BETTER UNDERSTANDING OF THE NATIONAL ELECTRICAL CODE

CONDUCTED BY F. N. M. SQUIRES
CHIEF INSPECTOR, N. Y. BOARD OF FIRE UNDERWRITERS

CIRCUIT BREAKERS WITH OVERLOAD PROTECTIVE DEVICES

806-n requires an automatic circuit-breaker when installed without other automatic overload protective devices, to have one pole in each ungrounded conductor. What would be the rule if the circuit-breaker was installed with an overload protective device?

If, for instance, a circuit-breaker is installed in a 3-phase 4-wire system, this rule would require the use of a 3-pole breaker. If, however, the ungrounded wires were protected by fuses ahead of the circuit-breaker, the breaker would not have to be 3-pole. (See also footnotes 1, 2, 3, 4, and 5 on lower half of page 103 of 1933 Code and also 1004-b.)

CORDS FOR HEATED APPLIANCES

Does 1603-c mean that all smoothing irons (any size) and all other appliances over 50 watts shall use type H heater cord, or does it mean all smoothing irons and appliances over 50 watts that produce a temperature over 250 deg. F. shall use type H cord?

There being no commas used in the first two lines, seems to indicate that the rule requires heater cords, type HC and HPD for all smoothing irons.

AMENDMENT TO 206-C ADOPTED

A. R. Small, chairman, Electrical Committee, N.F.P.A., advises that the interim amendment of 206-c has been adopted. The new text reads:

"The set-screw form of contact shall not be used unless designed to

EXTRA THICK INSULATION ON No. 8 WIRE

The thickness of insulation on No. 8 rubber covered wire required by the 1933 Code is 4/64 in. This is 1/64 in. more than required by the 1931 Code. The extra thickness has raised the question of continuing to permit three No. 8 wires in a 3/4-in. conduit. L. P. Denzel, chairman, Article 5 committee, has asked how much difficulty contractors are having as the result of this increased diameter of No. 8 wire. Before making any changes in Table I 503-q, the committee is anxious to get all of the field experience it can. Send all information to the editor of ELECTRICAL CONTRACTING.

insure a thoroughly good connection between the conductor and the terminal parts without damaging the conductor."

This amendment will be submitted to the next meeting of the Electrical Committee for final adoption.

GROUNDING OF FIXTURE ON UNDERGROUND CONDUIT JOB

If a fixture was used on a conduit job where voltage is over 150 to ground, 1403-a requires it to be grounded. Rule 1403-d states that a fixture shall be considered grounded when connected to a conduit job that is grounded according to Article 9. If the conduit is less than 25 ft. long it would not have to be grounded (904-a).

In this case, how would a fixture be grounded?

In this case the fixture could be grounded by means of a separate grounding conductor. This, of course, would also ground the conduit.

FIXTURES FOR GAS FILLED LAMPS

What would be considered an approved fixture for gas-filled lamps used in show windows as called for in 1504-b?

This rule does not state what kind of fixture wire should be used when wiring fixtures using gas-filled lamps, so I presume that any type could be used.

An approved fixture would be one which is acceptable to the inspection department having jurisdiction. It would have to be of such a design as to prevent undue heat reaching combustible material.

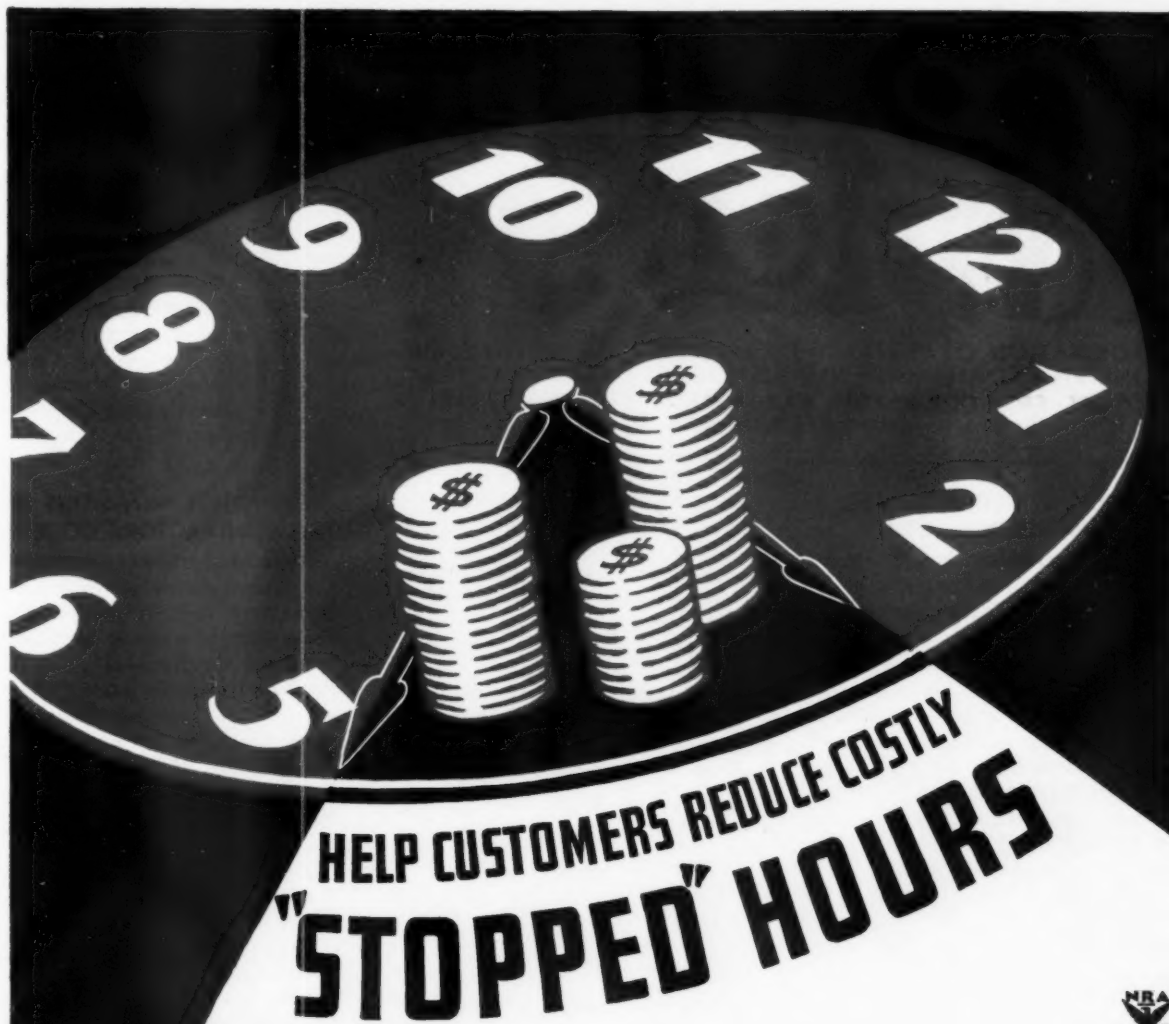
Heat resisting insulation would have to be used as required by 1402-d and 1505.

HANGING FIXTURES OUT DOORS

As I understand 1405-e, a weather-proof socket only could be used on fixtures in damp places, or hung on No. 14 wires. In other words they could not be hung from cords. Is this right?

When hung from No. 14 wires it states that they must be hung independently. How could this be done?

Medium or mogul base weather-proof sockets are to be either used on fixtures or hung on stranded wires not smaller than No. 14. This stranded No. 14 (or larger) wire is not flexible cord. The sockets are not to be supported by the circuit wires. Generally they are supported from a messenger wire.



The secret of Jefferson Super-Lag performance lies in the lag plate which is a part of the Super-Lag link. This plate delays the normal fuse action, provides a time interval or lag. This time-lag prevents the fuse from blowing on harmless temporary overloads—saves needless shutdowns and link replacements.

There is a sales opportunity for you in the high cost of your customers' STOPPED hours. For useless stops are radically reduced by fuses which protect TIME along with motors.

Jefferson Super-Lag Renewable Fuses protect time because of their lag method of overload protection of motors. Harmless momentary overloads or surges are not permitted to stop the machines—yet on dangerous prolonged overloads the motors are cut from the line and saved.

Sell protection against STOPPED HOUR losses as well as against motor burnouts by recommending Jefferson Super-Lag Fuses—all capacities, knife-blade and ferrule types.

JEFFERSON ELECTRIC COMPANY
Bellwood (Suburb of Chicago) Illinois

JEFFERSON
Super-Lag RENEWABLE **FUSES**



CONTRACTING news

INFORMATION OF INTEREST TO ELECTRICAL CONTRACTORS
CONSISTING OF ITEMS OF NEWS, SHORT ARTICLES, PRACTICAL
IDEAS, ETC., OUR READERS ARE INVITED TO CONTRIBUTE TO
THIS DEPARTMENT

HOUSE CONSTRUCTION BILL PASSES CONGRESS

To stimulate house remodeling and new construction Congress at its close passed the Administration housing bill.

The bill provides \$200,000,000 to insure loans up to 20 per cent of the aggregate made for house remodeling by any loaning institution. There is also provision made for insuring up to \$100,000,000 of 20-year mortgages on new homes with a mortgage limit of 80 per cent of appraised value but not to exceed \$16,000.

The administration expects to be able, through the provisions of this bill to stimulate the flow of private capital into home construction. Under the bill national mortgage associations capitalized at \$5,000,000 each will be empowered to issue obligations representing ten times their capital stock and to buy and sell insured mortgages.

CHANGES IN DISTRICT CODE CHAIRMEN

There have been a few revisions and additions to the list of district chairmen published in the June issue. The changes and new names are as follows:

- REGION No. 2.
District No. 2: Stanley Beach, 81 Wallace St., Newark, N. J.
District No. 3: Walter W. Whiffen, 82 Martine Ave., White Plains, N. Y.
District No. 5: E. G. May, 51 Central Ave., Albany, N. Y.
REGION No. 3.
District No. 7: Frank C. Bonnert, 122 S. Eutaw St., Baltimore, Md.
REGION No. 8.
District No. 2: J. O. Nelson, 300 E. Fourth St., St. Paul, Minn.
District No. 7: C. A. Vanderheiden, 418 Ogden Ave., Menominee, Mich.

- District No. 10: C. J. Kirkpatrick, 327 Capitol Ave., Pierre, S. Dak.
District No. 11: M. W. Whalen, 205 Main St. S., Minot, N. Dak.
District No. 12: Jos. N. Elzea, 18 N. 8th St., Miles City, Mont.

- REGION No. 9.
District No. 1: W. L. Fowler, 218 Third St., S.E., Cedar Rapids, Ia.
District No. 2: H. C. Evans, 1626 Walnut St., Kansas City, Mo.
District No. 3: Chas. R. Shrake, 905 N. Kansas Ave., Topeka, Kans.
District No. 6: Matt Whitney, 208 N. Tejon St., Colorado Springs, Colo.

- REGION No. 11.
District No. 5: Wm. A. Hopper, 213 N. Tenth St., Boise, Idaho
District No. 8: E. J. Palmquist, 420 N. Main St., Helena, Mont.

- REGION No. 12.
District No. 9: D. C. Bacon, 122-124 N. Second Ave., Phoenix, Ariz.

SPONSORSHIP OF CODE REMAINS WITH N. F. P. A.

At the recent annual meeting of the National Fire Protection Association, A. R. Small, chairman of its electrical committee announced that in the code conferences called by the utilities there would be no further agitation for the transference of sponsorship from the National Electrical Code from N.F.P.A. to any other sponsorship in the American Standards Association. The Code will continue to be published as it has in the past and finally the conference recognized the vested right of Underwriters' Laboratories for the sponsorship of standards for electrical devices.

These conferences called by the utilities included representatives of the manufacturers and the fire underwriters. Up to the time of Mr. Small's report there had been five meetings, the purpose of which was first to transfer the sponsorship of

the Code away from the underwriters, to take away from them the printing of the Code, to relieve Underwriters' Laboratories of its sponsorship for the standards of electrical devices, change the membership of the Electrical Committee, and finally rearrange the Code.

All of this program has been withdrawn with the exception of the last mentioned. A new presentation of the Code is being made by the power companies consisting, first, of the fundamentals of the present Code, and secondly, provisions subordinate to these fundamentals, and in a third group the details of application.

UTILITIES PROTEST PROVISIONS OF UTAH CONTRACTORS' CODE

A protest by the power companies in Utah against certain provisions of the contractors' code of fair competition was directed solely at the State Code and not the National.

The power companies asked first to be excluded from the provisions of the State Code "to the extent that the definition of 'Industry' as contained therein includes the servicing, repairing and maintaining of electric ranges, refrigerators, water-heaters and current consuming devices".

The companies also wanted exceptions from the scale covering electrical workers.

The deductions and recommendations of the State Board of Revision handed down on June 19 are quoted in full:

After hearing the evidence produced on behalf of the Utah Power and Light Company and the code authority of the electrical contracting industry and the study of the briefs and memoranda submitted by the interested parties, the Board finds as follows:

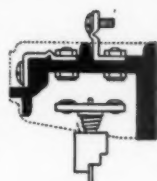
1. That the term "electrical contracting industry", as defined by Section 1 of Article 1 in the Code of Fair Competition is broader than common understanding of the people so considered the term prior to the adoption of the code.
2. That the attempt, on the part of an industry, to broaden the scope of its activity by use of the code is, as a general thing, detrimental to both the code and to the people thus brought under the purview of the code.
3. That the service rendered by the Utah Power and Light Company in repairing small current consuming appliances at a reasonable figure is of definite advantage to the consuming public.
4. That the repairing of most current consuming appliances is not generally encompassed within the term "electrical contracting industry."

Recommendation:

The Board respectfully recommends to the Administrator that Section 1 of Article 1 of the Code of Fair Competi-

A. C. ACROSS-THE-LINE STARTERS

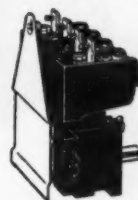
MANUAL
609



3 H. P., 110 V.—5 H. P., 220 V.—7½ H. P., 440/550 V.



AUTOMATIC
709



BOTH ARE PUSH BUTTON OPERATED

BULLETIN 609 MANUAL
A.C. Across - the - Line Starter, Type A, in pressed steel cabinet. Two reliable overload relays, which require no replacements, are reset from front of cabinet.

BULLETIN 609 MANUAL
A.C. Across - the - Line Starter, in Type B, water-tight, cadmium plated enclosure. Ideal for machines in dairies, bottling plants, breweries, etc.

BULLETIN 609 MANUAL
A.C. Across - the - Line Starter, in Type G, explosion-proof enclosure, for use in explosive atmospheres, gases, and other dangerous installations.

BULLETIN 609 MANUAL
A.C. Across - the - Line Starter, in Type A, pressed steel cabinet, provided with pedestal mounting. Dual mountings are also available.

BULLETIN 712 AUTOMATIC
A.C. Combination Across-the-Line Starter with manually operated disconnect switch. A combination of Bulletin 609 mechanism and Bulletin 709 automatic solenoid starter.

BULLETIN 712 AUTOMATIC
A.C. Combination Across-the-Line Starter, in water-tight enclosure.

BULLETIN 712 AUTOMATIC
A.C. Combination Across-the-Line Starter, with disconnect switch in dust-tight enclosure for flour mills, elevators, etc.



Whether you sell an automatic starter or sell a manual starter, in these two leaders of the Allen-Bradley line you can offer your customers the ultimate in performance and reliability for motor control in each class of service.

Both are push button operated! Outwardly, they resemble each other—inwardly, the protection which they afford man, motor, and machine marks their difference.

The Bulletin 609 Manual Starter is used on fans and other motor-driven units which require only overload protection and are not started and stopped frequently. They are used where restarting after shutdown, due to line failure, would not endanger operator or machine.

The Bulletin 709 Automatic Starter has a much broader field—it should be used on all machine tools and other equipment which require more safety features than only overload protection for the motor. The Bulletin 709 Automatic Starter protects man, motor, and machine—in addition to protection for the motor, it provides no-voltage release protection for man and machine. Both of these manual and automatic starters are available in a wide variety of enclosing cabinets that meet every service condition. For complete details, send for Bulletins 609 and 709.

ALLEN-BRADLEY CO.

1307 S. First Street

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ALLEN-BRADLEY



BULLETIN 709 AUTOMATIC
A.C. Across-the-Line Starter — Form 1—pressed steel cabinet, with Start and Stop buttons in cover for machine tools.

BULLETIN 709 AUTOMATIC
A.C. Across-the-Line Starter — Form 2—without push buttons in cover, for operation with temperature or water level controls, etc.

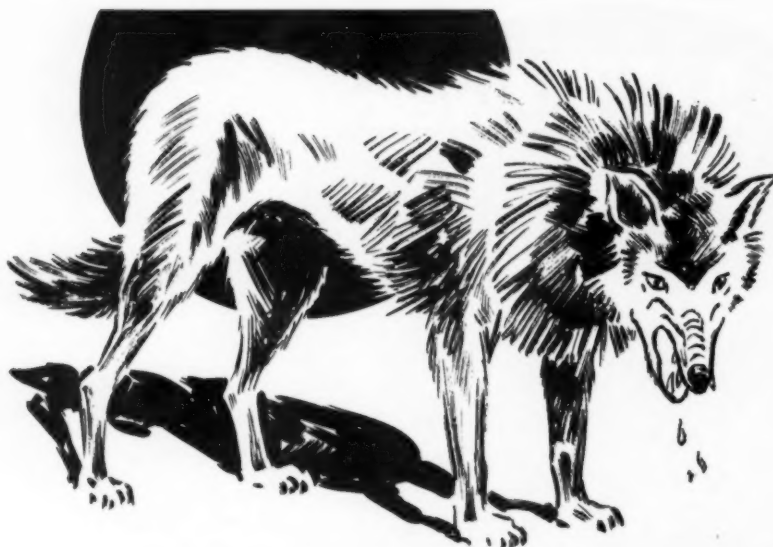
BULLETIN 709 AUTOMATIC
A.C. Across-the-Line Starter — Form 3—with three-way lever switch, for automatic or hand control.

BULLETIN 709 AUTOMATIC
A.C. Across-the-Line Starter, in Type B, water-tight, cadmium plated enclosure, for creameries, breweries, bottling plants, etc.

BULLETIN 709 AUTOMATIC
A.C. Across-the-Line Starter, in Type D, dust-tight enclosure, for flour mills, grain elevators, etc.

BULLETIN 709 AUTOMATIC
A.C. Across-the-Line Starter, in Type G, explosion-proof enclosure, for operation in explosive atmospheres or gases.

BULLETIN 709 AUTOMATIC
A.C. Across-the-Line Starter, in Type H, explosion-proof enclosure, with switching unit immersed in oil, for use where explosive gases are also corrosive.



The ENEMY of PROFIT

WASTE is the enemy of profit. It is like a slinking, pilfering wolf, cunningly doing its best work under cover. You are unknowingly feeding this destroyer of profit every time you buy materials that fail to give you a full measure of service.

Friction Tape especially, is a product that can waste your dollars because its quality is largely invisible, only actual service can prove its worth to you. Don't jeopardize an important job by the use of a few cents worth of poor tape.



Before you spend another dollar on Friction Tape... we invite you to test DUTCH BRAND... and learn the benefits of this "Extra-Service" product. Just clip this ad to your letterhead for a free test role.

DUTCH BRAND Friction Tape, Rubber Tape and Soldering Paste are sold by electrical jobbers everywhere.

VAN CLEEF BROS. Est. 1910

Manufacturers Friction and Rubber Tape and Soldering Paste
Woodlawn Ave., 77th to 78th Streets, Chicago, U. S. A.

**DUTCH BRAND
SOLDERING
PASTE**

A scientific mixture
—non-corrosive.
Cleans as it works.
Holds solder fast.
Less paste required
per job.

THE JUMBO PACKAGE
Contains 10 standard No. 8
rolls. The economical way for
repairmen, electrical contractors
and industrial users to purchase
Friction Tape, where individually
cartoned Tape is not
required.



**DUTCH BRAND
RUBBER INSULAT-
ING TAPE**

Fuses instantly without
heat. Molds into
one solid piece. It
stretches without
breaking because it con-
tains 20% more live,
new rubber.



See the DUTCH BRAND EXHIBIT at A CENTURY of PROGRESS-CHICAGO-1934

tion for the Electrical Contracting Industry of Utah be amended by adding thereto substantially the following:

"provided that nothing herein contained shall be construed to bring the business of repairing and servicing small electrical appliances wherein no rewinding of motors or major repair thereto is involved within the term 'electrical industry'."

The balance of the applicants desired a modification of Section 1 of Article 1 of the Code to allow the installation or wiring together with the relief requested by the Utah Power and Light Company.

As to this the Board finds:—

1. That in many of the smaller communities there are no qualified electrical contractors other than the employees of the electrical utility supplying current to the community.

2. That there is not sufficient electrical contracting work in these communities to justify the retention by the electrical utility of any one man for the purpose of doing electrical wiring and installation work.

3. That the men who have heretofore been employed by the electrical utility in these smaller cities for the purpose of performing electrical and other kindred electrical contracting work have been employed upon a monthly basis throughout the year and that the wages paid by the utility for this class of work is reasonable in view of all the circumstances.

The Board is of the opinion that some modification should be made in the electrical contracting code which will allow electrical utilities to engage in the business of electrical wiring in those communities where there is no licensed electrical contractor, but inasmuch as there was not sufficient evidence produced at the hearing, the Board is unable to make any recommendation concerning the specific change necessary in the code to effect this purpose.

Recommendation:

The Board recommends that the interested electrical utilities consult with the code authority of the electrical contracting industry and jointly prepare such modification to the code as will effect the opinion of the Board as herein set forth and that upon effecting such proposed modification, to then submit the matter to the Administrator."

CONTRACTORS TO INSTALL ALL SIGNS IN SOUTH BEND

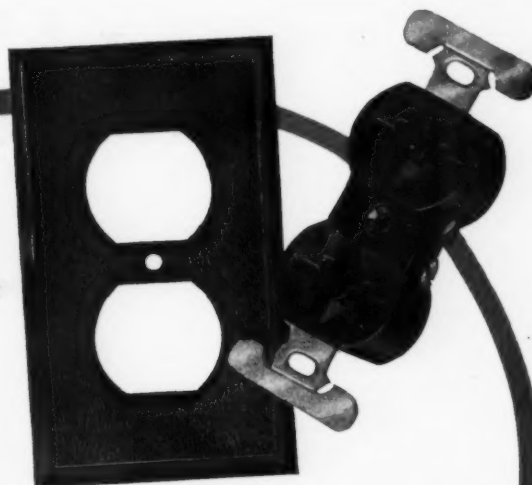
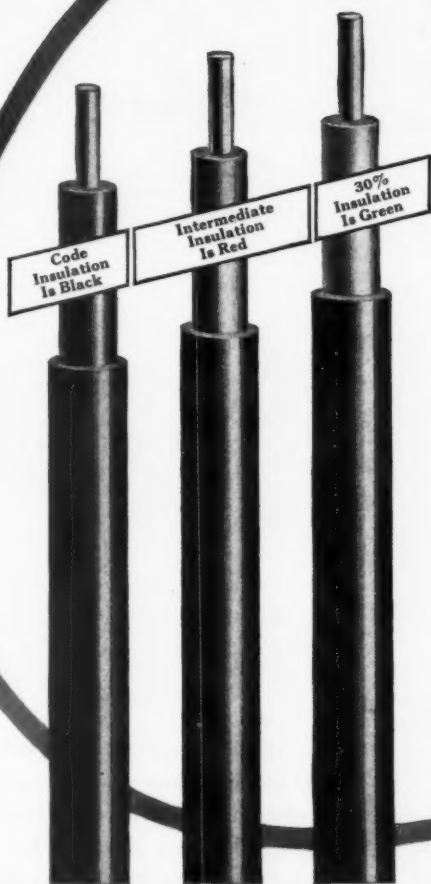
A new electrical ordinance approved in South Bend, Indiana, June 7, will materially effect all electric sign installation and operation in that city in the future. The new regulations are particularly directed toward the installation of Neon gas signs, control of which has been lacking in the electrical code of the city as it has heretofore existed.

Many of the window and interior signs erected since the advent of Neon type signs have been classed as movable displays and have escaped city code provisions. Much of the work has been done by unlicensed

USE G-E SAFECOTE CODE WIRE



**Flame-retarding Finish
Reduces Fire Hazard
to a Minimum**



USE G-E SWITCHES OUTLETS & PLATES

The Mark of Quality Wiring

**For complete information on the products mentioned above,
call a G-E Merchandise Distributor or write Section DW-197,
Merchandise Dept., General Electric Co., Bridgeport, Conn.**

GENERAL ELECTRIC

WIRING MATERIALS

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

which would you choose



the Old



patent applied for

the New

Available in $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1" sizes.

ELECTRICALLY



WELDED

There's a new type of electrical conduit on the market today that makes old-style conduit as out-of-date as a rowboat. It's ELECTRUNITE STEELTUBES—the modern threadless rigid conduit with the knurled inside finish.

Steel and Tubes, Inc., Cleveland, laughed at conventional conduit ideas years ago—could see no reason why conduit should be wastefully heavy just to permit threading—so they developed a rigid conduit and connections that eliminated threading, yet provided the necessary electrical and mechanical protection for electrical circuits. It saved weight. It saved cutting and bending time. It fitted up faster. But inside it was no different, so engineers went to work again to improve the inside surface. Tiny projections, thousands of them, were raised all over the inside

ELECTRUNITE

REG. U. S. PATENT OFFICE

Choose for *SPEED*?



Electrunite Steeltubes Conduit with the knurled inside finish showed by actual test a saving of 30 per cent in the effort required to pull cable through. The cable rides the tops of the tiny knobs instead of making contact the entire length.

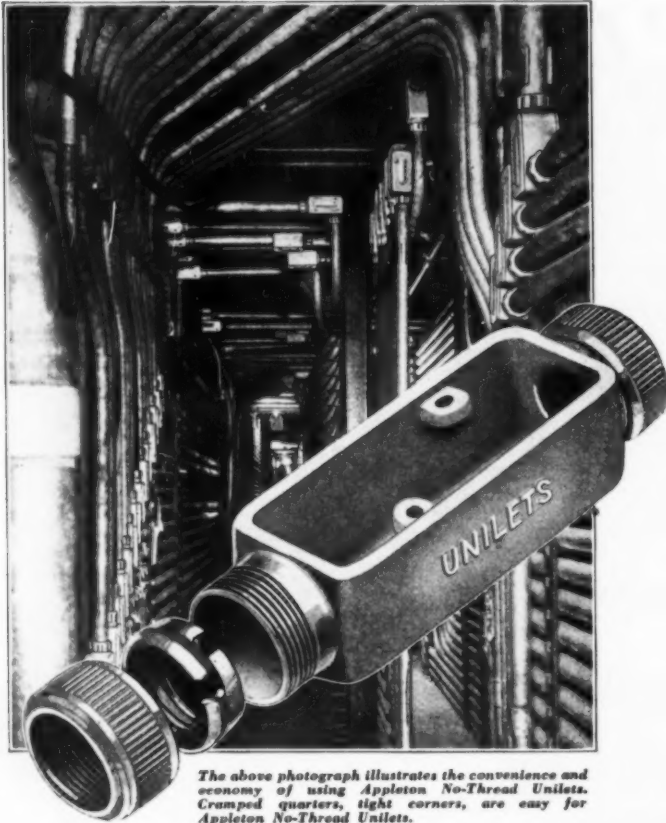
surface. Tests showed that cable, instead of hugging the entire surface, was carried on the tops of these ball-shaped mounds—that cable pulled through with approximately 30% less effort—that cable showed less tendency to jam when pushed through—that less time was required on the job.

Again Steel and Tubes had broken away from tradition—had improved an already fine product. And its welcome by contractors everywhere who have tried ELECTRUNIT STEELTUBES is evidence that again our pioneering has been fruitful.

THE MODERN THREADLESS RIGID CONDUIT
Steeltubes



Electrical Division
STEEL AND TUBES, INC.
WORLD'S LARGEST PRODUCER OF ELECTRICALLY WELDED TUBING
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The above photograph illustrates the convenience and economy of using Appleton No-Thread Unilets. Cramped quarters, tight corners, are easy for Appleton No-Thread Unilets.

SAVE TIME AND MONEY ... with Appleton No-Thread Unilets

● To shorten the time of installation, use Appleton No-Thread Unilets. They are easier to work with in cramped corners or with bent conduit. All you have to do is to insert the conduit, tighten the nut, and the job is done.

Appleton No-Thread Unilets are made of malleable iron with a cadmium coating—giving the greatest possible resistance to corrosion or constant vibration.

Sold through Jobbers

APPLETON ELECTRIC COMPANY
1704 Wellington Ave. Chicago, U. S. A.

New York—150 Varick St. Los Angeles—340 Arusa St.
Philadelphia—530 Arch St. San Francisco—655 Minna St.
St. Louis—420 Frisco Bldg. Detroit—7724 Woodward Ave.

APPLETON

No-Thread Malleable

The Original Threadless Conduit Fittings

UNILETS

Reg. U. S. Pat. Off.



Type "T"
No-Thread Unilet



Type "C"
No-Thread Unilet



Type "LL"
No-Thread Unilet



No-Thread Coupling

and outside contractors. In many cases signs are supported only by the electrical cable; and proper insulation is not given to exposed connections and electrodes.

All signs in the city will be inspected, under present plans of the city electrical inspection department. Those not conforming to the code provisions will have to be brought up to the standard required. No installation can be made in the future except by licensed electrical contractors.

TAMPA HAS \$100 LOW BID DEPOSIT LIMIT

The Tampa (Fla.) Chapter, N.E. C.A., reports an organization representing approximately 90 per cent of the electrical work done in its district and is working for 100 per cent.

The Code of Fair Competition is being put into operation with \$100 set as the low limit for bid deposits.

The president of the chapter is J. W. Whatley. Other officers are W. S. Monroe, vice-president; R. C. Bigby, treasurer, and L. Chaney, secretary.



CHAIRMAN FOR CODE REGION No. 3:

Frederick M. Shepard, president Cates & Shepard, Philadelphia, electrical contractors and engineers operating on large construction projects and industrial work, is the chairman of the Code Committee for Region No. 3. Twenty-five years ago he, with Mr. Cates, started Cates & Shepard and he has been president since 1913 when Mr. Cates left. He started in the electrical business with Stanley Electrical Manufacturing Co. and after two years went with Northern Electric Co. as assistant sales manager. Three years were spent with the General Electric Co. In 1909 he went to Philadelphia where the desire to go into business for himself led him into the electrical contracting business. Mr. Shepard, who is 55 years old, attended Harvard Electrical Engineering School, class of 1902. He was first president of Jovian order in Philadelphia and is a past president, Philadelphia Electrical Contractors Association, Electrical Contractors Association of State of Pennsylvania, Electric Club of Philadelphia and is now president of Electrical Constructors of Philadelphia.

YOUNGSTOWN

• BUCKEYE •

CONDUIT

FULL WEIGHT
BLACK ENAMELED
ELECTRO GALVANIZED
HOT DIPPED GALVANIZED

THE YOUNGTOWN SHEET
AND TUBE COMPANY

General Offices:
YOUNGSTOWN, OHIO



FRETZ-MOON CONDUIT IS MADE UNDER SCIENTIFIC CONTROL

THE operator, shown above at a control table in the Fretz-Moon plant, throws switches, turns valves and sets knobs—then modern scientific instruments take over the control of the furnace and mill that produce Fretz-Moon Conduit. • The huge coils of steel skelp are, of course, threaded by men into the machines which level and feed it into the Fretz-Moon continuous furnace. Other specially-trained men carefully watch the operation of furnace and mill, as well as following operations. But actual control of the "continuous process" is entirely automatic. Modern instruments measure the temperature of the furnace and hold it accurately to the degree desired. Other instruments check and maintain the proper rate of travel of the steel skelp through the furnace and welding rolls. • Thus, as the skelp is formed and welded into pipe which, after finishing operations, becomes conduit, every foot of it has been in the furnace for a definite period of time and is at the definite temperature required for perfect welding. • Contractors who use Fretz-Moon

Conduit remark on its uniformity, its ease of working—bending, threading, cutting, etc. You, too, can profit from the use of Fretz-Moon Conduit—the conduit that is made by the scientifically-controlled "continuous process"—the conduit that is always uniform.



STEEL AND TUBES, INC.
CLEVELAND • OHIO
EXCLUSIVE SALES AGENTS

FRETZ-MOON

**Rigid
conduit**

IOWA ASSOCIATION COMMENDS N. E. C. A. FOR CODE EFFORTS

At the June 2 meeting of the Iowa Association of Electrical Contractor-Dealers a resolution was passed of appreciation to the members of the code committee and the officers and directors of the National Electrical Contractors Association for the time, energy and money expended in preparing, and presenting the Electrical Contractors' Code of Fair Competition.

The members of the resolution committee who prepared the document were W. J. McNealy, W. L. Fowler and Victor Thomas.

ST. LOUIS CHAPTER ELECTS OFFICERS

At a meeting held April 25 by the members of the St. Louis (Mo.), Chapter of the National Electrical Contractors Association, the following officers were elected:

W. C. Burton, Burton Electric Co., president; C. M. Hanenkamp, Hanenkamp Electric Co., vice-president, and W. A. Koeneman, Guarantee Electric Co., treasurer.

Additional members elected to the Board of Directors are L. P. Bretch, A. J. Dunbar and S. C. Sachs.

INSPECTORS TO HELP ENFORCE CONTRACTORS' CODE

A motion was passed at the June 7 meeting of the Illinois Chapter, Western Section, International Association of Electrical Inspectors, requesting the International Association officers to offer to the Electrical Contractors' Code Authority the cooperation of the inspectors' association in carrying out the intent of the electrical contractors' code. This resolution came at the conclusion of a morning session devoted almost entirely to a discussion of this code.

L. E. Mayer, chairman, Electrical Contractors' Code Authority, explained the operations of the code, showing particularly how the inspectors could cooperate in its enforcement.

He was followed by Victor H. Tousley, secretary, I.A.E.I., who went into the relationship of the inspector to this code in considerable detail. Mr. Tousley pointed out that the code definitely committed the contractors to observe the requirements

Use the Time and Labor Saving of

ROMEX

NON-METALLIC
SHEATHED CABLE

to make a better profit on house wiring installation... new work or remodelling



1. Light in Weight. Easy to lug and lift.



2. A flexibility that saves time in close quarters.



3. Easy to strip. Fewer bandaged knuckles. Pliers and knife only are needed.

- Tinned copper conductors, solid or stranded, depending on size. →
- High grade Code rubber compound assures good dielectric and insulation strength. →
- Paper threads braided with cotton assure a sturdy fibrous protection for the rubber on each conductor against injury or abrasion in outlet boxes. →
- Multi-folded paper tape, provides a cushion over each individual conductor as well as a further protection against mechanical injury. →
- Fillers (protected against moisture absorption) fill the valleys between conductors, and serve as a RIP CORD in stripping off the outer jacket. →
- Tough outer braid provides an over coat capable of withstanding pulling—in stresses and external abrasion. →



GENERAL CABLE CORPORATION

OFFICES IN PRINCIPAL CITIES

Announcing

THE NEW

KLIEGLIGHT

—a very unusual unit, for
FLOODLIGHTING or SPOTLIGHTING
Outdoors or Indoors



For the first time it provides a practical unit in which the shape of the beam projected can be easily made to conform exactly to the contour of the object or area to be illuminated . . . with high intensity, and a sharp cut-off of light, without spill, and with absolute uniformity of illumination. Furthermore, it is decidedly more efficient in light output than formerly accepted standard units—readily demonstrated to your complete satisfaction.

It is entirely different from anything you have ever seen—radically new in both principle and design—provides more effective and better lighting facilities, at greatly reduced operating costs.

Essentially it consists of a biplane filament lamp supported in a prefocused position within an ellipsoidal reflector, which directs all the light rays through a variable lens system, after passing an arrangement of adjustable shutters, which shape the beam to any desired form, all elements being enclosed in a suitable housing.

Its distinctive advantages have been quickly recognized, and its use promptly effected for numerous applications, including Radio City installations—the facts are very interesting. We'll be glad to send you the information.

New opportunities for profit are offered by these new units. They'll do what heretofore was considered impossible. Write for full details on our new "Klieglights."

KLIEGL BROS

UNIVERSAL ELECTRIC STAGE LIGHTING CO., INC.

THEATRICAL . DECORATIVE . SPECTACULAR LIGHTING

321 West 50th Street, New York, N. Y.



Motorized appliances in use in homes and offices of the United States now number nearly 30 million. Many are old, millions need repair. There will be a large call for repairs in 1934.

Ohio Brush Kit—No. 1 contains replacement brushes and springs to fit 98% of the existing makes of appliances listed here.

With this kit you will have the right brush and spring without sending away or resorting to make-shifts.

Conveniently arranged—easy to use—easy to keep in order. Write today for prices—get ready for profitable repair work.

THE OHIO CARBON COMPANY
12504 BEREA ROAD CLEVELAND, OHIO

**30 MILLION
MOTOR APPLIANCES
NOW IN USE...
MILLIONS
NEED REPAIR**

**This Kit gives you
the right brush for**

VACUUM CLEANERS . . . FANS
. . . WASHING MACHINES . . .
SEWING MACHINES . . . BUFFERS . . .
DRILLS . . . DENTAL MOTORS, ETC.

of recognized standards which obviously are the National Electrical Code or local ordinances. He pointed out that the violation of these requirements constituted non-compliance and that the electrical inspector should make it his job to see that this part of the code was enforced.

He also pointed out the opportunity that the inspector had to help the local code administrators to secure compliance, particularly with respect to the practice of job cutting.

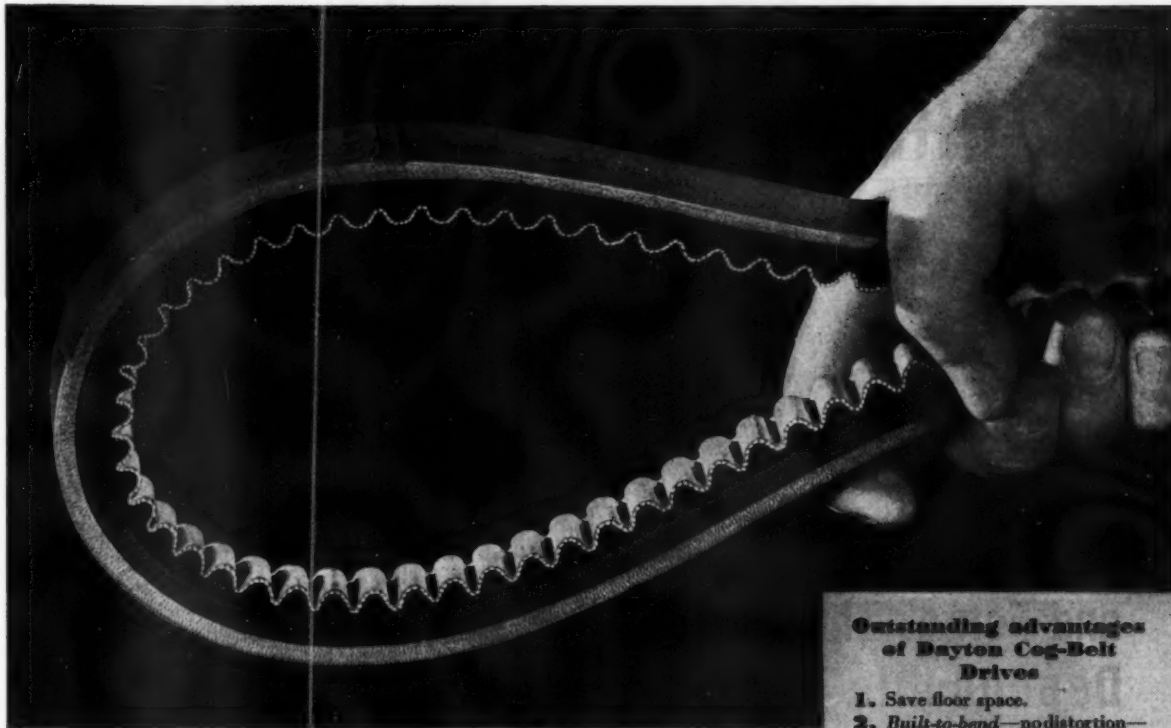
Other speakers on the program were S. B. Williams, editor of *ELECTRICAL CONTRACTING*, on "Current Conditions and Trends in the Electrical Industry"; F. H. Moore, secretary-treasurer, Indiana Chapter, on "The Newest Chapter in the I.A.E.I."; C. R. Welborn, superintendent of label service, Underwriters' Laboratories, Chicago, on "Identification of Listed Devices and Materials"; E. E. Fies, assistant chief electrician, Chicago Tribune, on "Electrical Problems Involved in the Installation and Operation of the Modern Newspaper Plant"; L. V. James, General Electric Company, Chicago, on "Lighting for Seeing"; C. W. Gustafson, chief engineer, Mutual Fire Prevention Bureau, Chicago, on "Recent Experiences with Article 32", and Amos Germain, engineer, Westinghouse Electric & Manufacturing Company, Chicago, on "Electronic Devices in Industrial Plants".

PORTLAND REQUIRES PLANS AND SPECIFICATIONS

On all installations over 600 volts, except tube systems, or over 200 amperes, the Portland, Ore., electrical department now requires plans and specifications prior to issuance of a permit. The plans and specifications must give the following information:

- A complete layout (riser diagram) of the proposed electrical wiring;
- A separate and complete layout of the proposed electrical wiring in each story of any building;
- The type and location of the service and the type, size, and location of the service switch;
- The size of all conduits and/or other wiring enclosures to be installed;
- The number, size and type of all conductors installed in such conduits or other wiring enclosures;
- Location of every proposed outlet where current is issued or controlled;
- Wattage or amperage of all proposed outlets;

Built to bend



Scientific construction of Dayton Cog-Belts makes possible the amazing performance of Dayton Cog-Belt Drives

Long life and low maintenance cost—these are outstanding features of Dayton Cog-Belt Drives. And the reason is that Dayton Cog-Belts are "built to bend." Their exclusive *cogged section and laminated construction* give them a flexibility never before attained in a V-type belt.

And along with that, their patented reinforcement gives unequalled cross-wise rigidity. Thus, regardless of pulley diameters, there's no distortion, buckling or rippling, no "squashing" in the pulley groove—the only V-Belt that combines maximum flexibility with cross-wise rigidity. Furthermore, the sides are die-cut—not molded. This means greater gripping power at any speed—

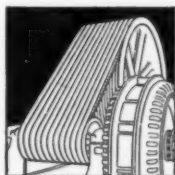
no slipping or sliding—less loss of power, less tension needed, less wear on bearings.

And along with their greater efficiency, Dayton Cog-Belts *cost less to use*. Adjustments are seldom necessary, for the "stretch" is removed in the process of manufacture. And their longer life means *lower replacement costs*—often less than half that of ordinary belts.

But there are many more reasons why Dayton Cog-Belt Drives give greater service for less money. May we send you all the facts?

THE DAYTON RUBBER MFG. CO.
DAYTON, OHIO

Factory Distributors in Principal Cities and all Westinghouse Electric and Manufacturing Co. Sales Offices



Dayton

COG-BELT DRIVES

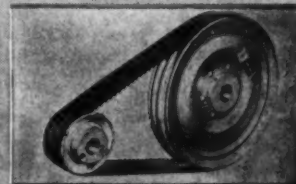
Also manufacturers of Dayton Fan Belts... Dayton Red Tube Radiator Hose... and the famous Dayton Thorobred Tires and Tubes

Outstanding advantages of Dayton Cog-Belt Drives

1. Save floor space.
2. *Built-to-bend*—no distortion—no internal heating.
3. Greater gripping power—no slipping or sliding.
4. Stretch removed—fewer adjustments necessary.
5. No dressing or lubrication.
6. Less tension required—easy on bearings.
7. Longer life—belt replacement costs often cut in half.
8. Quiet—Clean—Rugged.

Complete drives—pulleys and belts—in stock. Fractional to 100 H. P.

DAY-STEEL PULLEYS



Investigate the exceptionally low cost of Dayton Cog-Belts with Day-Steel Pulleys

G-E TIME SWITCHES



WIRE THEM

and Forget Them—They Use the Dependable Telechron Motor

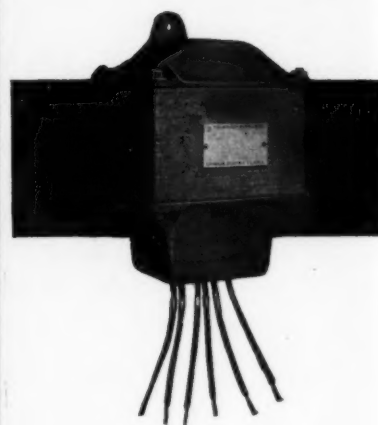
USE G-E time switches and you will find that you have no expensive maintenance and service calls eating up the profit on your time-switch installations. They are operated by the dependable Telechron motor, which has been performance-tested and time-proved.

The Telechron motor—self-starting and synchronous—requires no winding or regulating. Its operation is entirely automatic. This motor keeps time as accurately as though the time switch were geared to the power-plant generator.

You profit from every angle by selling G-E time switches—on the sale of the switch itself, on the installation, on minimum maintenance, on customer good will, and on quickly obtainable stocks.

May we tell you more about them? Call the nearest G-E sales office for further information, or mail the attached coupon.

CASH IN ON THIS NEW BUSINESS



HOW often small drills, compressors, vacuum cleaners, fans, and similar motor-driven equipment, and such shop appliances as soldering irons and glue pots, are connected to lighting mains!

This is not lighting load. By installing a small G-E air-cooled transformer for stepping down the voltage, these 115-volt devices can be operated from the power circuit. The saving in operating cost is considerable.

Now is the time to cash in on this new business. G-E air-cooled transformers are available for practically any application where a special voltage of 600 volts or less is required.

For further information call the nearest G-E sales office, or mail the attached coupon.

GENERAL ELECTRIC

General Electric Company
Dept. 6B-201, Schenectady, N. Y.

Gentlemen:

Time Switches ☐

Air-cooled
Transformers ☐

Please send me descriptive and application data on the products I have checked above.

Name

Firm

Street

City State

320-25

- (h) Location, voltage, horsepower, kilowatt, or similar rating of every motor;
- (i) Location and wattage or other current consuming rating of every appliance, apparatus and/or other consuming device to be installed or provided for;
- (j) Panelboard and/or switchboard schedule showing the wattage or amperage, of the various feeders and branch circuits to be installed, and the number of spare feeders and/or circuits provided for future installation;
- (k) The size, location, and structural details of any transformer vault and a circuit diagram giving layout of primary and secondary circuits and the type of switching and protective devices to be installed.

WILLIAMS HEADS VANCOUVER ASSOCIATION

At the annual meeting of the Vancouver (B. C.) Electrical Association on May 2, C. H. E. Williams was elected president. Other officers are vice-president, H. J. Sayer; secretary, J. C. Reston; executive committee, B. Hutchison, S. F. Ricketts, R. Hall, T. C. Simmons, T. E. Barwood, R. G. Wallace and W. M. Mott.

PROTEST AMENDMENT TO MANUFACTURERS' CODE

The Electric Motor Dealers Association of Northern California have protested by resolution to General Johnson of N.R.A. against the proposed amendment to the Electrical Manufacturers' Code defining the activities of an electrical manufacturer. The resolution contends that the amended definition would open the door to all types of manufacturers to erect and install inside and outside their own premises without regard for the construction code.

LEWIS R. ROGERS

Lewis R. Rogers, head of the electrical contracting firm of Rogers & Abbe, Schenectady, N. Y., died on May 6 at Schenectady at the age of 59.

Mr. Rogers was born in Sandusky, Ohio, June 8, 1874, and for many years had been engaged in the electrical contracting business. He was active in contractor activities and at the time of his death was president of the Tri-City Master Electrical Contractors Association. He was also a former president of the New York State Electrical Contractors Association.

CRESCENT facilities for Producing RAILWAY SIGNAL CABLE PARKWAY ARMORED



is your assurance that this company is equipped to manufacture any type of wire or cable ordinarily required by industry. You can safely turn to CRESCENT to fill your wire and cable needs.

For economy
and service
make CRESCENT
your regular source
of supply

CRESCENT PRODUCTS — a Complete Line

"Crescent" National Electric Code Rubber Covered Wire and Cable.

Intermediate Grade Rubber Covered Wire and Cable.

"Imperial" 30% Rubber Covered Wire and Cable.

"Crescent" Lead Encased Wire and Cable.

"Crescent" A. B. C. Armored Bushed Cable.

"Crescent" Lead Covered Armored Cable.

"Crescent" Flexible Metallic Conduit.

"Crescent" Varnished Cambric Cable, Lead Encased or Braided.

"Cresflex" Non-Metallic Sheathed Cable.

"Crescent" Flexible Corda.

"Crescent" Parkway Cables.

ALL KINDS OF SPECIAL WIRES AND CABLES

"Forty-Five Years of Knowing How"

CRESCENT

INSULATED WIRE & CABLE CO. INC.

TRENTON,

NEW JERSEY.

WIREMOLD

MIDGET



(Cross sections of MIDGET showing capacity)

"The smallest WIREMOLD is one of our biggest money makers!"
"Put it up in a jiffy—then it stays put!"
"Plenty of room to fish. Easy to push or snake!"

THAT'S what contractors everywhere are saying about MIDGET WIREMOLD!

And you can't fool contractors on MIDGET; for MIDGET is built just like regular WIREMOLD—on a smaller scale! And they know it!



THE WIREMOLD COMPANY, Hartford, Connecticut

MINERALLAC



Cable or Conduit Hanger



Jiffy Clip



Statiscopes

Write for Literature

MINERALLAC ELECTRIC CO.
 25 No. Peoria Street, Chicago, Ill.

New York City Branch
 381 Fourth Avenue

Subscribers

You can't afford to miss a single issue

Give us your new address if you have moved

A ROLL O' TAPE

ELECTRICAL FLASHES GATHERED AMONG THE BIG WIRE AND PIPE MEN
 BY
ELECTRICAL CONTRACTING'S FIELD EDITORS

BIRMINGHAM, ALA., reports that it is now engaged in reinspection of wiring. Unsafe wiring will be ordered repaired or replaced.

CODE Authority Member "Bob" Hodge of Kansas City is an Ex-State Golf Champion, and several times City Champion. He is still able to show the youngsters the master's touch about the greens.

BECAUSE of the tendency to install ranges on inadequate wiring all dealers in British Columbia must report to the inspection department the name and address of all purchasers of ranges or rangettes.

FRRIENDS of the Swanson-Nunn Electric Co. of Evansville, Ind., will be glad to learn that the big fire which gutted their shops and ruined much equipment and stock did not delay the company's operations. The next day the staff took steps to maintain operations at the same speed.

GOSSIP for Estimators—Testing and adjusting the 454 exterior floods on Kansas City's Power and Light Building required 935 manhours labor, exclusive of assistance rendered by manufacturer's engineers.

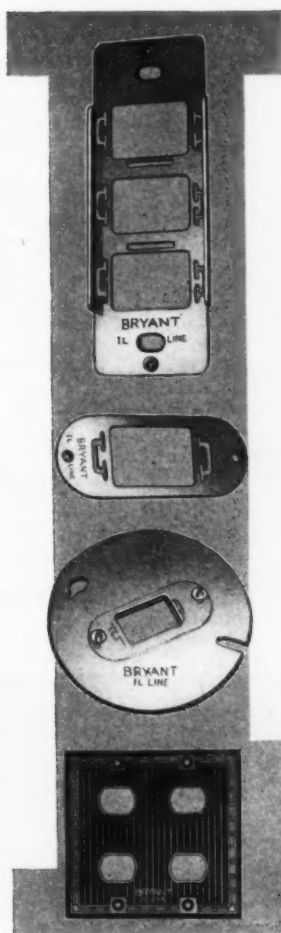
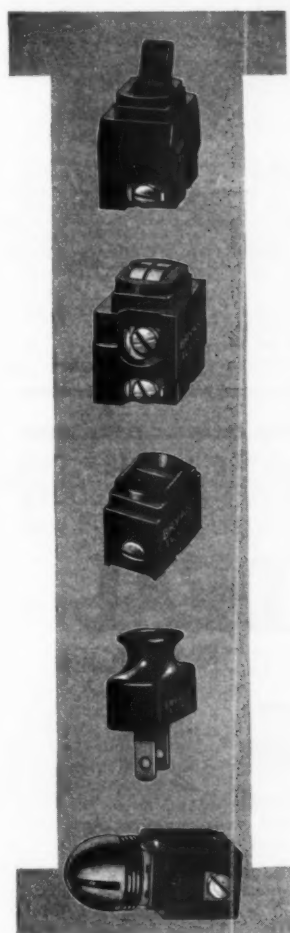
THE electrical contractors of Portland, Ore., are to be credited with the inauguration of a local industry movement that is known as the Electrical Industry Committee. It was started by the contractors and is quite apart from NRA and Code matters. H. C. Ploense of the Morrison Electric Co. is the chairman and Y. C. Bressie of the Bressie Electric Co. is another contractor on it. The rest of the committee is made up of one

Announcing! THE BRYANT INTERCHANGEABLE "IL" LINE

REDUCED STOCK INVESTMENT FOR THE CONTRACTOR AND DEALER!

TRIPLE THE POSSIBILITIES OF A SINGLE GANG!

UNLIMITED COMBINATIONS!



THE BRYANT INTERCHANGEABLE "IL" LINE OFFERS STOCKING ECONOMY TO THE CONTRACTOR AND DEALER.

A SMALL STOCK MAKES THOUSANDS OF COMBINATIONS.

MODERATE PRICES.

RUGGED CONSTRUCTION.

FULLY APPROVED.

RETAILED THROUGH ELECTRICAL CONTRACTORS AND DEALERS EXCLUSIVELY.



WRITE FOR COMPLETE CATALOG INFORMATION.

BRYANT *Superior Wiring Devices*

Manufactured by THE BRYANT ELECTRIC CO., Bridgeport, Conn.

MANUFACTURERS OF "SUPERIOR WIRING DEVICES" SINCE 1888 . . . MANUFACTURERS OF HEMCO PRODUCTS

NEW YORK 60 East 42nd Street . . . CHICAGO 844 West Adams Street . . . SAN FRANCISCO 149 New Montgomery Street

DEALERS WANTED!

**Every Range Owner in Your Town Is
Worth Up to \$15 Quick Profit for You!**

Do you want to make some money easily? Do you want to line up repeat business? Do you want to increase your weekly sales? You are the dealer we want. If you are willing to call on range owners, show them an item they want to buy and NEED—then you are in for some extra profits. No selling necessary. Just call on electric range users, show them the NEW Chromalox Super-Speed REPLACEMENT TOP BURNER. Let them use it and try it for a few days. Demonstration of increased cooking speed gets orders 8 out of 10 times.

Sounds too good to be true, but hundreds of dealers are making money speeding up old ranges with Chromalox. Easily installed—only screw-driver and pliers needed! No large investment involved. A few stock sizes fit all makes of electric ranges, regardless of model.

Here's Proof



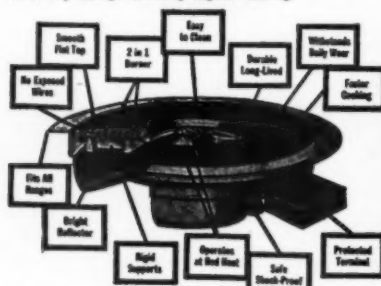
Alex Bear, Richmond, Va., electrical contractor has sold 165 Chromalox range units—made over \$560.00 profit.



Correll Electric has practically Chromalox-equipped every range in Linton, Indiana—resold customers on electric cookery.

J. E. Hesps of Altoona, Pa. has made over \$500.00 speeding up old ranges with Chromalox. Demonstration quickly gets orders.

By TEST...Faster, More Efficient and Longer Live than any Range Units of Equal Rating!



MAIL COUPON FOR FULL DETAILS

WITH YOUR BUSINESS LETTERHEAD TODAY!

EDWIN L. WIEGAND CO.

Manufacturers of Chromalox Heating Units
7585 Thomas Blvd., Pittsburgh, Pa.

Without obligation, send us complete data about Chromalox Super-Speed Replacement Range Units and how we can make money selling them. There are approx. elec. ranges in the territory we serve. Check which () We sell elec. ranges () We do not sell elec. ranges. () Send us catalogs about Chromalox-equipped electric ranges.

Signed Position

man from each of the other branches of the electrical industry—wholesalers, radio, electric sign, electric elevator, labor, and insurance. The object of the committee is to act as a clearing house and receive the data concerning local conflicts between the various branches and then ironing out the troubles. It also keeps posted on proposed municipal and state regulations affecting the industry and if contrary to the best interests of any branch or of the industry as a whole acts to present a united front in combating them.

LEO J. McCORMICK, Chief Electrical Inspector of Kansas City, Mo., has just completed a four year law course—all night work.

FROM British Columbia comes the report that 96 Red Seal certificates were issued last year. The average number of outlets per Red Seal home was 59.

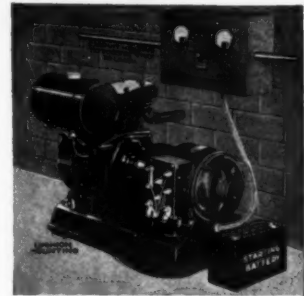
BUFFALO reports that its program of certifying Red Seal wiring is having a beneficial affect upon non-certified wiring. In 1931 the average outlets per home in the greater Buffalo area was 48. In 1934 this has jumped to 61. Red Seal homes in the last year averaged 86 outlets.

WM. WACHTER, Wachter Electric Company, Kansas City, Mo., has just completed a sub-station in the Park Central apartment hotel. Having 78 electric ranges, this job proved a worthwhile prospect for change-over to primary service. Wachter is proud of his selling job, having effected a welcome energy cost saving for the owners, as well as providing a nice contract during a low ebb in his other work.



DISPLAYS WIRING HAZARDS: Glen W. Wilson of the Valley Electric Company, Mountain View, Cal., sent in the above photograph to show what he is doing to educate the public on the hazards of defective wiring. Pictures of horrible examples are taken and specimens of hazardous devices and materials are collected. These, together with clippings from ELECTRICAL CONTRACTING, are mounted on a lamp advertising frame and put on display. The display was put in the company's windows a few weeks ago and attracted considerable attention and now it is being shown in an insurance agent's window.

ALTERNATING CURRENT ANYWHERE WITH KATO AC ELECTRIC PLANTS



All a.c. models self-energizing—generate 110 volts, 60 cycles, a.c. Sizes 300 to 5,000 watts. \$138.00 and up. Plant sales mean profitable wiring jobs and fixture sales. Also creates potential buyers of electrical appliances. Operates radios, refrigerators, Neon signs, etc. Ideal for summer resorts, oil stations, sound trucks or any isolated place. Supplies d.c. for speakers. You can buy through your jobber. Also complete line of 52 volt plants. Write for interesting descriptive literature.

KATO ENGINEERING CO.
MANKATO, MINNESOTA, U. S. A.

Mfr's of a.c. Generators and Converters for operating a.c. Radios on 32 and 110 volts d.c.

**MAKE MORE MONEY ON
YOUR PRESENT BIDS--REDUCE
PRICES ON FUTURE BIDS with**

IDEAL

WIRE CONNECTORS



Their savings in labor and material costs permit the contractor to make more money on estimates already submitted—allow him to "whittle" future estimates even lower—get more business and at better profits.

Solderless and tapeless, they give better electrical contact, greater mechanical strength and at far less cost per joint. Solderless IDEAL Thread Lugs, too, effect similar savings. Write for free samples and test them yourself. SEND THE COUPON TODAY.

Approved by Underwriters' and Factory Mutual Laboratories. Recommended by National Electric Code.

Ideal Commutator Dresser Co.

1041 Park Ave. Sycamore, Ill.

Ideal Commutator Dresser Co.,
1041 Park Ave., Sycamore, Ill.
Send the free samples. I'll try 'em.

NAME
ADDRESS
CITY STATE

This combination **MADE NEWS**



1,632,822
1,798,486

U. S. LETTERS PATENT NUMBERS:
1,272,436
1,272,790
OTHER PATENTS PENDING

1,765,000
1,856,549

PLUS

AMERICORE
(CODE)

AMPARAK
(INTERMEDIATE)

AMERITE
(30%)



For maximum performance in

RUBBER COVERED WIRE

ALWAYS accepted as the highest possible standard for quality—**American Steel & Wire Company Building Wires** now offer the many added advantages of **Safecote** finish. Good news, indeed, because, in addition to superior construction and proved performance of the wire itself—this remarkable finish will not carry or support flame—

pulls more easily—does not soften or crack and is impervious to moisture. Furnished in all standard colors and made in sizes No. 18 AWG to 2,000,000 CM. Send for a sample—put a flame to it—bend it—and you will understand why **Americore—Amparak or Amerite—with Safecote Finish—**will serve you better and more economically.

1831



1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

SUBSIDIARY OF UNITED STATES STEEL CORPORATION
AND ALL PRINCIPAL CITIES

Empire State Building, New York
First National Bank Building, Baltimore

Pacific Coast Distributors: Columbia Steel Company, Russ Bldg., San Francisco

Export Distributors: United States Steel Products Company, New York

◆◆◆ PARANITE

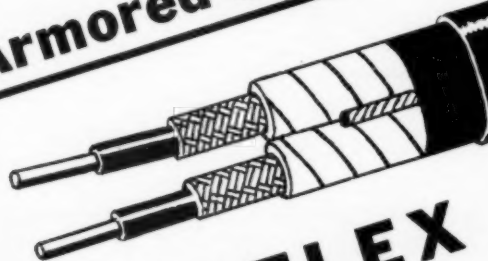
**THIS NAME
IS YOUR GUARANTEE**

Specify -



PARANITE ABC Armored Cable

- 1—Conductors protected with overall wrap of moisture-proof kraft paper.
- 2—Kraft paper permits easy stripping without injuring conductors with sharp tools.
- 3—Anti-short bushings make insulation strongest at the most vital point.
- 4—Bond Hook construction of steel armor gives maximum grounding capacity.
- 5—Paranite ABC armored cable insures Safety—Saves Time—Saves Labor.



PARAFLEX Non-Metallic Sheathed Cable

- 1—Conductors insulated with high-grade code compound.
- 2—Insulation protected with heavy paper and cotton braid.
- 3—Each conductor further protected by spiral wrap of heavy paper armor.
- 4—Moisture-proof filler between conductors used for quick removal of outer insulation.
- 5—Outer braid is moisture resistant, flame repellent and waxed for easy handling.
- 6—Paraflex has Appearance, is Durable and Economical.

If it's
PARANITE
it's Right!

◆◆◆ PARANITE

WIRE & CABLE CORPORATION
JONESBORO INDIANA
DIVISION OF
ESSEX WIRE CORP.
DETROIT MICH.

NEWS MANUFACTURERS

A DEPARTMENT FOR THE ANNOUNCEMENT OF ACTIVITIES OF MANUFACTURERS THAT ARE OF INTEREST TO CONTRACTORS, SUCH AS CHANGES IN EXECUTIVE PERSONNEL, BRANCH OFFICES, NEW PRODUCTS, ETC.

GENERAL ELECTRIC CO. ELECTS VICE-PRESIDENTS

The board of directors of the General Electric Co. at a meeting on May 25 in New York City elected the following vice-presidents:

J. E. Kewley, Cleveland, in general charge of the incandescent lamp department; R. C. Muir, Schenectady, in charge of the engineering department; C. E. Tullar, Schenectady, in charge of the patent department; E. O. Shreve, Schenectady, in association with vice-president J. G. Barry, in the commercial activities of the apparatus and supply business of the company; and H. L. Andrews, Erie, in charge of the activities connected with the electrification of steam railroads.

W. O. Batchelder, Chicago, was elected a commercial vice-president in charge of the commercial activities of the Chicago district.

The company also announced that T. W. Frech, formerly vice-president in charge of the incandescent lamp department, will remain with the company in an advisory capacity and continue to give much of his time to lamp development.

GAMEWELL APPOINTS CARROLL GENERAL SALES MANAGER

The Gamewell Co., Newton, Mass., announces the appointment of William J. Carroll general sales manager of the parent company and its subsidiaries.

Mr. Carroll has been with the company for 15 years during which time he held the positions of publicity manager, sales engineer, vice-president and general sales manager of the Rockwood division of the company. He leaves his latter position at Wor-

cester to take up his new duties at the main office of Gamewell Co., Newton.

Prior to his association with Gamewell, Mr. Carroll spent several years with two nationally known advertising agencies.

Four bulletins have been issued by Benjamin Electric Manufacturing Co., Des Plaines, Ill., as follows: Floodlighting for Softball Fields; Turning Night Time Into Playtime; Building Business for Service Stations, and Benjamin Design and Equipment Data for the Floodlighting of Play Ground Baseball, etc. Bulletins contain illustrations of night views, layouts and descriptive information.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has just published a folder entitled "Recommendations For Lighting Tennis Courts." This folder, designed for the use of electrical contractors, central station lighting service engineers, and owners of tennis courts, shows what equipment is needed and where it should be placed for proper illumination. Two plans are included: one designed for tournament play and the other for ordinary games. Both plans show wiring diagrams, spacing of fixtures and method of mounting units.

The Square D Co., Detroit, Mich., has just published a digest which is a condensed illustrated catalog of forty pages giving information and prices on nearly all products manufactured in both the Switch and Panel Division in Detroit and the Industrial Controller Division in Milwaukee.

PROFIT BY USING GREENLEE TOOLS

THE greater the efficiency of the tools you use, the more chance you have for meeting competition and for making a profit on each job. That is where Greenlee Conduit Benders and Knockout Tools come in. They cut costs on every job where they are used.



Hydraulic Conduit Benders

Greenlee Hydraulic Conduit Benders insure profits because they bend conduit quicker and easier than by other methods. In addition, they make smooth, even bends, eliminating many fittings and making it easy to pull in wire. They are easy to take to the job, too, because they are portable.



Knockout Tools

Greenlee Knockout Punches and Cutters make it easy to enlarge holes in switch boxes, cabinets, etc. They form clean-cut holes quickly and accurately, without any reaming or filing.

Other Tools

Hydraulic Pipe Pushers

Joist Bore

Bit Extensions

Electrician Bits

Let Us Send Complete Information

GREENLEE TOOL CO. ROCKFORD ILLINOIS

GREENLEE TOOL CO.
ROCKFORD, ILLINOIS

Please send complete information on the following:

- ☐ Conduit Benders
☐ Knockout Tools

Name _____

Street _____

City _____

State _____

My jobber is _____

July New Products

Metal Florduct

Metal Florduct for extending low potential wiring across floor surfaces is announced by The National Electric Products Corp., Pittsburgh, Pa. Florduct consists of two pieces, base and capping, so formed as to "snap" together, with concealed fastening means in the base.



It stands $\frac{1}{8}$ in. in height, with a gradual sloping ramp like plate extending to floor surface covering a width of $1\frac{1}{2}$ in. The system consists of an outlet extension cap which can be used between an existing floor outlet and a run of Florduct to a new location; an internal adapter elbow to be used as a junction between Florduct and a baseboard wiring system and a service fitting through which wires are extended at termination of Florduct run. It is designed to accommodate popular requirements and takes circuits for two or three telephones, or wires of a half a dozen buzzer circuits.

Rubber Caps

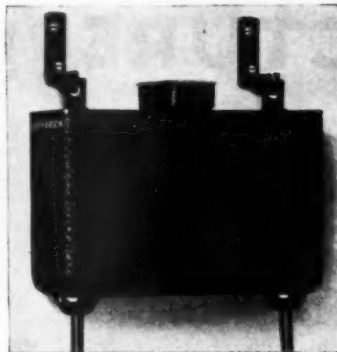
The Bryant Electric Co., Bridgeport, Conn., announces Hemco two-piece shock-proof rubber caps molded of compounded rubber to obtain the proper degree of resiliency to make assembling



easy, and sufficient hardness to prevent accidental separation. Cap has strain relief slots making it unnecessary to thread wires through holes. Strain relief members are supported firmly by inside wall of cap. Three hole sizes are available, each with an exclusive inside lip, which provides a snug fit for a wide range of wire sizes. Cap also has enclosed terminals.

Indoor Cabinet Transformer

Jefferson Electric Co., Bellwood, Ill., announces a line of indoor cabinet type luminous tube transformers known as "Series 723". Transformer is enclosed in a rust-resisting steel narrow style, single piece deep drawn case. Some of the features of the transformer are Jefferson mid-point grounded balanced design, mica insulation, double-vacuum treatment of complete core and coil unit, low heat rise, high silicon steel non-aging core, processed porcelain bushings and rubber gasketed bushings. Unit has hooks for hanging, wiring box for rigid



or flexible conduit connection and $2\frac{1}{2}$ ft. long secondary cables extending from bottom of case. A pull switch is standard equipment, but if cord and plug are desired on primary, attachment can be made through wiring box.

Test-Lite and Fuse Puller

A combination test-lite and fuse puller is announced by Ideal Commutator Dresser Co., Sycamore, Ill. Unit is made of reinforced bakelite like a pair of pliers and can be used for testing, removing or



inserting fuses from 30 to 100 amp. capacity, testing circuits of from 110 to 550 volts, a.c. or d.c., handling all types of "live" electrical parts, adjusting loose cut-out clips, etc. Unit has test pins mounted on handle ends and opening or closing handle adjusts pins to proper distance. Test light is enclosed in handle. Overall length of unit is 7 in.

Double-Duty Convenience Outlets

The Merchandise Department of General Electric Co., Bridgeport, Conn., announces a line of double-duty, triple-pole, twin convenience outlets with appliance grounding provision which will serve all

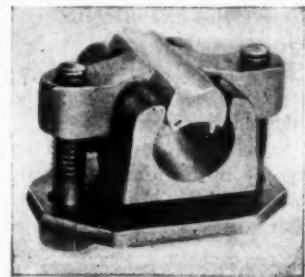


standard two-wire plugs. No. 2989 is for permanently grounded systems without ground terminals and is designed for use on systems already grounded. Ground contact of this outlet is connected to supporting strap. No. 2988 is for ungrounded systems with ground terminals to which a ground wire may be attached. Both these outlets are for

use in two-wire circuits only and have combination slots with which either a standard three-pole plug cap or a standard two-pole cap may be used. No. 2990 outlet is used for three-wire circuits, and ground contact of this outlet is attached to an identified ground terminal.

Clamp Type Terminal

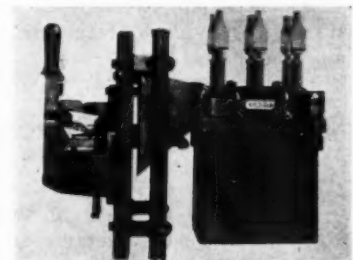
Burndy Engineering Corp., New York City, has placed on the market a clamp type terminal which will accommodate a large range of conductor sizes for use with current transformers, known as type HM. Manufacturer states that one



size of connector will take the following cables: One cable, all sizes between No. 6 and 500,000 cm. inclusive; two cables, all sizes between No. 6 and 400,000 cm. inclusive, and three cables, all sizes between No. 6 and 200,000 cm. inclusive. For a two cable tap-off, it is possible to arrange two connectors back to back, using only one set of bolts to tighten. Clamp is installed without the use of solder, thereby eliminating soldering tools.

Oil Circuit Breaker

The Condit Electrical Manufacturing Corp., Hyde Park, Boston, Mass., announces a high speed oil circuit breaker of enclosed mechanism type for switchboard, cubicle and metal clad switchgear arrangements, known as type E-47.



Unit is furnished for 600 amp. at 7500 volts and 800 amp. at 2500 volts in 2, 3 and 4 poles, with an interrupting capacity rating of 25,000 kv-a. Breaker may be manually, solenoid or universal motor operated. Some of the features of breaker are Bakelain bushings, an arcing contact system, a rigid cast frame with deep recess for tank; steel plate tank and full length tank liners and barriers between phases.

Electrical Contracting, July, 1934



SANGAMO
FORM K SINGLE POLE SINGLE THROW
SYNCHRONOUS TIME-SWITCH

in a TIME-SWITCH

—Look on the inside of a SANGAMO

No matter what its price you get only the best. For instance, in the SANGAMO Form K time-switch you get a slow speed (240 r.p.m.) self-starting synchronous motor.

—Pure silver mechanical contacts which are conservatively rated at 40 amp. The same contacts are used in SANGAMO flashers which require many thousands more operations than a time-switch gets in a lifetime.

—A 24-hour dial which is supplied with three pairs of operating levers, allowing for either one, two or three "on" and "off" periods each day. Flexibility of operation is an important fundamental of Sangamo design.

—A rustproof pressed steel case which has three $\frac{3}{4}$ " pryouts, one at the bottom and one at each side.

In all SANGAMO switches you get the results of more than 30 years' experience in the manufacture of precision instruments.

You can't go wrong on any SANGAMO time-switch—they're all highest quality. See your jobber for this new Form K Synchronous Motor Time-Switch and find out about the other items in Sangamo's complete line of Switches for either A.C. or D.C. operation.

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

Manufacturers of

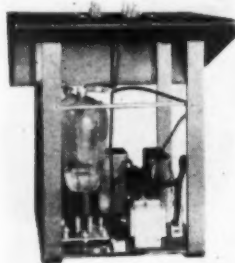
SANGAMO

Precision TIME-SWITCHES

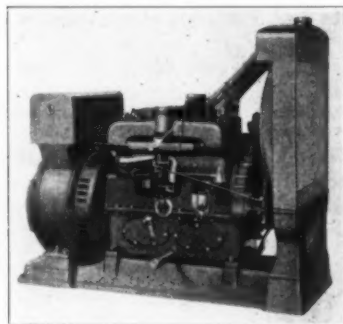
July New Products

Out-Voltage Regulator

Roller-Smith Co., New York City, announces the Kathetron out-voltage regulator which is based on an electronic tube, and consists of a booster transformer, an impedance transformer and a Kathetron tube control unit, rated 50 KVA, 2300 volt control for single phase. Booster transformer is of usual distribution transformer design. Its primary is



wound for voltage of the supply line, and secondary is wound for a voltage equal at least to the maximum drop due to load on line to be regulated. Impedance transformer is of special design resembling standard distribution transformer. Primary winding is in series with primary winding of booster transformer. Secondary winding is connected to the tube control unit. A circuit making use of reflected impedance causes the grid voltage, which varies in relation to load, to control output of the booster transformer. Manufacturer states that the specific application of this apparatus is the elimination of all visible light flicker in those cases where starting and stopping of motors or other devices bring about voltage changes that result in light flicker. Unit is compact, fool-proof and has no moving parts.



Electric Plants

A complete line of electric plants ranging from 330 watts to 10,000 watts is announced by Universal Motor Co., Oshkosh, Wis. Models are being manufactured in both air-cooled and water-cooled types and can be had in all standard voltages, both d.c. and a.c., and equipped for manual, remote or full automatic control. Shown above is a 5 kw. automatic water-cooled series generator set.

Test-Plier

Star Fuse Co., Inc., 235 Canal St., New York City, announces a test-plier for pulling fuses up to 200 amp. in size and testing circuits from 70 to 250 volts, made of bakelite and fibre. Testing device is a carbon lamp in series with 1600



ohm resistance, and the lamp will light on 65 volts. With resistance removed it will have a range of 30 to 110 volts. When testing carbon lamp glows red, as an indication current is on the line. Light can be seen through a small opening in dome-shaped section of unit. The prongs which go into base receptacles or lamp socket plugs are hinged and can be folded. Lamp sockets can be tested by flattening threads of a screw plug and by placing screw plug on prongs.

Mark-Time Switch

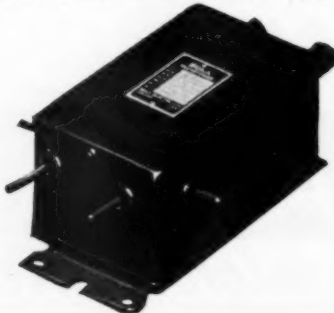
M. H. Rhodes, Inc., New York City, announces Mark-Time switch No. 142L for installation in closets, stockrooms, refrigerator rooms, libraries, etc. Switch is equipped with special locking feature



to prevent automatically shutting off when remaining in the room. Switch gives a delay of three minutes, but if it is desired to stay longer, toggle can be locked in "On" position so that current will continue indefinitely until lock is released. Switch replaces any wall switch and includes lock, one interval, three minutes.

Transformers

The Sola Electric Co., 2525 Clybourn Ave., Chicago, Ill., has placed a line of signal and control transformers on the market, which are small and compact. Units can be supplied for all common low voltage requirements. Housing types are 20 to 100 va. and encased types 50



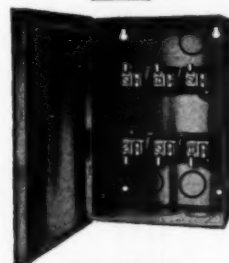
to 500 va. Encased type has core and winding hermetically sealed in a black enameled metal case. Flexible secondary leads are supplied but may be replaced with binding posts.

Utility Outlet

Fullman Manufacturing Co., Latrobe, Pa., has placed on the market No. 330 "Latrobe" Tom Thumb utility outlet for use in wood floors, mantels, baseboards,



show windows, and other installations free from moisture or mechanical injury. Unit is 2½ in. in diameter and 2 in. high and is fitted with 10 amp. 115 volt bakelite receptacle.



Fuse Blocks

A line of enclosed Vystipe fuse blocks is announced by Trumbull Electric Mfg. Co., Plainville, Conn. Blocks can be supplied in either two- or three-pole, 250 or 600 volts, 30 to 400 amp. and can be furnished in black or cadmium plated enclosures. Units are equipped with Vystipe fuse terminals as used in "RB" safety switches which, manufacturer states, reduce fuse heating to a minimum.

Plastic Compound

B. S. Barnard & Co., New York City, announces Duct Seal, a water-tight, acid resisting plastic compound for sealing service conduits at underground entrances into buildings, cable vaults or manholes. Plastic can be worked into end of conduit and around cables and adheres with water-tight contact to clay, fibre, iron, wood or cement conduit and all cable surfaces. Manufacturer also states that compound will harden slightly but not dry out over years of service. Compound can easily be removed when necessary with a thin sliver of wood or fibre without injury to cables.

Electrical Contracting, July, 1934

HERE,
CODE REQUIREMENTS
AND
OPERATING REQUIREMENTS
WERE the START,
NOT the GOAL

NEW

C-H EXPLOSION-PROOF SAFETY SWITCH LINE

WHILE C-H Motor Control Leadership may be the strongest endorsement of all C-H apparatus, in this day of careful buying a purchaser may want more specific proof. Such men will find that C-H Safety Switches talk their language. An example is the new C-H Explosion-Proof Line.

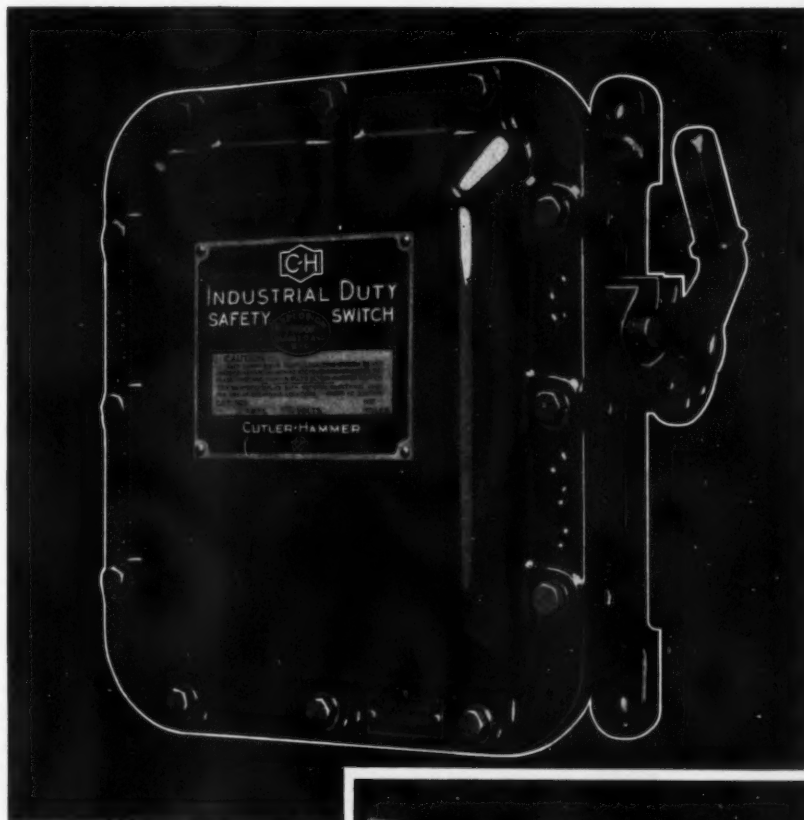
Here, more-than-ample strength of case and accurately machined joints of full required width are characteristic. And the switching mechanism is an identical design used successfully for years in heavy-duty industrial service. New high performance, and new safe applications in hazardous locations, are here available.

These fine new Explosion-Proof Switches are typical C-H Safety Switches, products of C-H Motor Control Leadership throughout electrified industries. That guarantees that they will serve well, and earn the greatest profit and prestige for their sellers.

Complete stocks of C-H Safety Switches are carried by responsible independent wholesalers. CUTLER-HAMMER, Inc., *Pioneer Manufacturers of Electric Control Apparatus*, 1306 St. Paul Ave., Milwaukee, Wis.

C-H Meter Service Switches, of types approved in most localities, are made to the same standards as C-H Safety Switches. Ask for catalog.

For Class I, Group D locations (gasoline, alcohol fumes, etc.). In non-fusible, 30, 60, 100 and 200 amp. sizes, single and double throw, quick make and quick break . . . Equally suitable C-H Safety Switches offered at less cost for all lesser hazards (dust, lint, etc.) . . . Also complete weather-proof line, enduringly protective, not made with perishable gaskets.

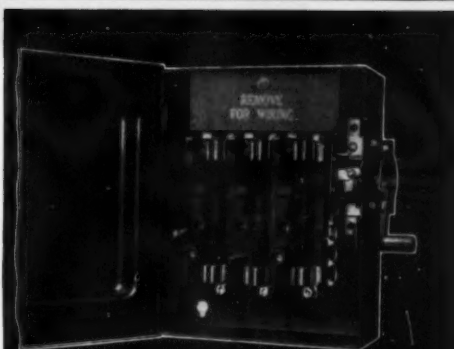


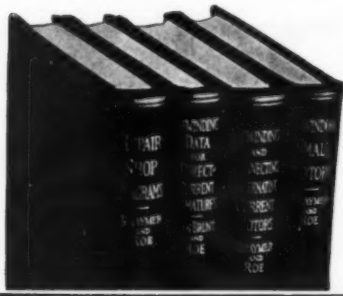
CUTLER HAMMER



Each is especially small in size, due to use of time-tested mechanism in Bull. 4115 Type A Safety Switch at right — compact, with high arc rupturing capacity, and torque spring mechanism, for heavy currents.

(B-276)





NOW—this
ELECTRIC MOTOR
REPAIR LIBRARY
tells how to handle all kinds
of profitable repair and re-
winding jobs

Do you know how to:

- lay out a wave winding
- test a.c. and d.c. motors to locate grounds, shorts, opens, quickly and positively
- properly record data when stripping armatures so that it will be instantly usable for correct rewinding by yourself or any experienced winder at any time afterward
- determine how many coils can safely be cut out
- lay out single-phase fan motor windings
- change single-phase windings for two- or three-phase operation
- make cross or equalizer connections on lap windings
- lay out frog-leg windings
- handle every step in a rewinding job from the time it comes into the shop until it leaves
- wind stators for turbogenerators
- band high-speed armatures
- rewind motors for voltage, speed, frequency, or equal changes
- etc., etc., etc.

1,079 pages of practical shop methods and data on jobs like these in this library. A complete, modern key to repair of all motors. Nothing else in it; every page filled with definite, practical facts for the industrial maintenance man and the electric shop worker.

4 volumes, \$10.00, payable in
easy monthly installments

THIS set of books should be on the shelf of every man who ever has to touch a motor for purposes of repairing it or changing it to meet different operating conditions. In shop language and with practical shop methods it covers every step in stripping, rewinding and connecting a.c. and d.c. motors of all kinds.

How to change motors for different
operating conditions

Here is all the information you need in order to determine what changes various types of motors permit; to lay out new windings for specified service conditions; and to handle every step in the work with satisfactory results.

Covers all types of motors, from those used in small household and commercial appliances of all kinds, to mining and railway motors. Explains principles underlying the different types of windings; gives definite instructions for doing the various rewinding jobs. Also gives many data, tables and diagrams constantly needed by the repair man, including data difficult to get from any other sources.

Low price—easy terms—10 days'
examination on approval

Bought separately the books in this Library would cost you \$11. By using this coupon you need pay only \$2.00 in 10 days and \$2.00 monthly until the special price of \$10.00 is paid. In addition, we give you 10 days in which to examine the books. Send no money; simply fill in and mail the coupon now; let us know your answer after you have seen the books.

 McGraw-Hill Book Co., Inc.
 330 W. 42nd St., N. Y. C.
 Send Electric Motor Repair Library for 10 days' examination on approval. In 10 days I will send \$2.00, plus few cents postage, and \$2.00 monthly for four months, or return books postpaid. (We pay postage on orders accompanied by remittance of first installment.)
 Name.....
 Address.....
 City and State.....
 Position.....
 Company.....EC 7-34
 (Books sent on approval in U. S. and Canada only.)

Killark Electric Manufacturing Co., St. Louis, Mo., has just released Catalog No. 12, illustrating its line of conduit fittings known as "Electrolets," explosion resisting fittings, bells and signaling transformers and fuse panels.

Supplementary bulletins illustrating each class of material made by the company have also been published.

General Cable Corporation, New York City has issued a bulletin covering U R C weatherproof wires and cables. The bulletin is illustrated and shows the difference between ordinary weatherproof and U R C weatherproof wires and cables.

Bulletin 2282 covering explosion-proof condulets for hazardous locations has been published by Crouse-Hinds Co., Syracuse, N. Y. This is a 64-page booklet containing photographs of typical installations; explosion-proof condulet diagrams; descriptions and illustrations of each unit; application data and tables and a catalog number index and price-list.

A 16-page book entitled "Contributions to the Modern Service Station" has been published by Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa. The book, which is illustrated in colors, shows suggested designs and methods of service station lighting. In addition nofuse load centers, fans, heaters, water coolers, water heaters, immersion heaters, battery chargers, motors and control for every application, steam generators, gas electric sets, etc., are listed.

Jenkins Bros., 510 Main St., Bridgeport, Conn., announces the appointment of Gordon N. Lewis as assistant manager of its tape division

Classified Advertising

Wanted: Thoroughly competent combined estimator and foreman with selling ability for contractor-dealer employing three to five men. Must understand every type interior wiring, the servicing of appliances, and something about refrigeration. Education and personality essential. Location 25,000 population city in New York state. A permanent position with a regular income. Give complete details as to experience, family, age, moderate salary expected, etc. Address Box 734, Electrical Contracting, 520 No. Michigan Ave., Chicago, Ill.

Wanted: Manufacturer's representative calling on jobbers and contractors to introduce a new line of grounding devices. Address Box 735, Electrical Contracting, 520 No. Michigan Ave., Chicago, Ill.



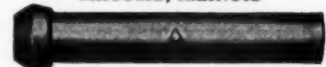
For
Residence Wiring

The Best and Safest Method is
a properly installed KNOB and
TUBE job. Be sure and get the

Bull Dog
 TRADE MARK
 REGISTERED

Assembled Knob because it "HAS
A GRIP LIKE ITS NAMESAKE."

ILLINOIS ELECTRIC PORCELAIN CO.
 MACOMB, ILLINOIS



"Standardize on
STANDARD
Transformers"

ALL TYPES
Indoor and
Outdoor
Service

Send for
Descriptive
Bulletin

STANDARD TRANSFORMER CO.
 Warren - - - - - Ohio

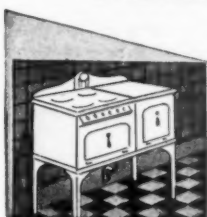
Keep Up-to-Date

By reading these pages you will acquaint yourself with what is newest and best in electrical supplies and equipment. When communicating with an advertiser mention

Electrical Contracting

Faster, easier Wiring!

ARROW *NEW BAKELITE*



RANGE OUTLET

**Straight-in Wiring.
Solderless connections**

**Cut your cost of
range installations**



DESIGNED to give more wiring room and easier connections either from the bottom or back. 3/4" and 1" Knockouts are provided in the bottom and back. Wires enter straight in to the solderless connections. A cable clamp is built in, interchangeable for bottom or back wiring. Interior construction of 7950 is illustrated at left.

Separate ground strap No. 7951 is available for plug when metallic cable is used. The new Outlet is smaller than predecessors and is modernistically designed and durably constructed of black BAKELITE.

ECONOMY OF INSTALLATION is the feature engineered for the Contractor to reduce his cost of range installations — to help sell more wiring jobs of this character. Send for your Catalog Data-sheet giving full information on this new development.



No. 7950



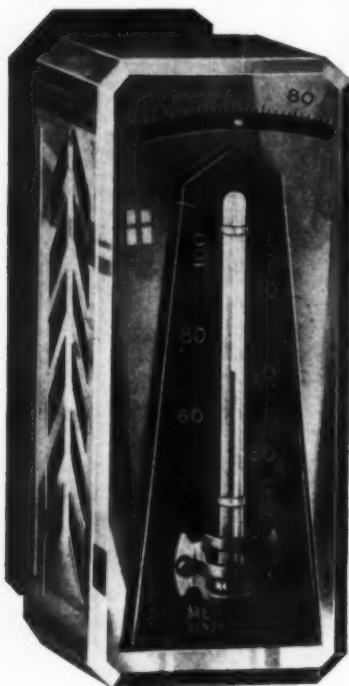
No. 7951

ARROW ELECTRIC DIVISION
THE ARROW-HART & HEGEMAN ELECTRIC CO. HARTFORD, CONN.

MERCOID SENSATHERM

The Outstanding Thermostat for Room Temperature Control

Listed by Underwriters' Laboratories



Mercoid Sensatherms are used in connection with all types of electrically controlled heating equipment such as oil burners, stokers, gas burners, air conditioners and unit heaters. There are many applications with electric heaters such as maintaining very uniform temperatures in incubators, or preventing freezing in pump or valve rooms. The Mercoid Sensatherm is an object of beauty and mechanical perfection. It is one of the most sensitive instruments produced, and is extremely accurate and dependable in operation.

The Sensatherm contains a new type Mercoid Magnetic Switch which is immune to pitting, oxidation or corrosion. It is dust-proof and cannot be affected by any fumes or gases. The contacting surfaces remain permanently clean and will operate indefinitely. Sensatherms are also available for day and night temperature regulation, and for heating and cooling operations with air conditioning equipment.

Write for Bulletin No. 100.

Mercoid Controls Are Also Distributed and Stocked in Many Cities By The Graybar Electric Co., Inc.

THE MERCOID CORPORATION
Sole Manufacturers of The Mercoid Switch
4223 Belmont Avenue, Chicago, Illinois

Index to Advertisers

A	
Allen-Bradley Co.	21
American Blower Corporation.....	47
American Steel & Wire Company....	37
Appleton Electric Company.....	26
Arrow-Hart & Hegeman Electric Co., The	45
B	
Bryant Electric Co., The.....	35
BullDog Electric Products Co.....	Inside Front Cover
Burndy Engineering Co., Inc.....	46
C	
Crescent Insulated Wire & Cable Co., Inc.	33
Cutler-Hammer, Inc.....	43
D	
Dayton Rubber Mfg. Co., The.....	31
E	
Essex Wire Corporation.....	38
F	
Fretz-Moon Tube Co.....	28
G	
General Cable Corporation.....	29
General Electric Company.....	23, 32, Back Cover
Graybar Electric Company.....	4
Greenlee Tool Co.....	39
H	
Hazard Insulated Wire Works.....	48
I	
Ideal Commutator Dresser Co.....	36
Illinois Electric Porcelain Co.....	44
J	
Jefferson Electric Company.....	19
K	
Kato Engineering Co.....	36
Kliegl Bros.	30
M	
McGraw-Hill Book Company, Inc....	44
Mercoid Corporation, The.....	46
Minerallac Electric Company.....	34
N	
National Electric Products Corpora- tion.....	Front Cover
O	
Ohio Carbon Company, The.....	30
Okonite Company, The.....	48
P	
Paranite Wire & Cable Corp.....	38
R	
RCA Victor Company, Inc.....	2
S	
Sangamo Electric Company.....	41
Sherman Mfg. Co., H. B.....	46
Square D Company.....	Inside Back Cover
Standard Transformer Co.....	44
Steel and Tubes, Inc.....	24-25
V	
Van Cleef Bros.....	22
W	
Wiegand Co., Edwin L.....	36
Wiremold Company, The.....	34
Y	
Youngstown Sheet and Tube Com- pany, The.....	27

BURNDY QIKLUG



BURNDY
ENGINEERING CO., INC.
305 EAST 45th STREET, NEW YORK

SHERMAN



SHERMAN Solderless Service Connectors are used for all purposes where reliable Electrical and Mechanical Solderless Connections are required—for Primary, Secondary, Service and Transformer.

SOLDERLESS SERVICE CONNECTORS

These are the universally accepted type but have additional improvements and advantages—not easy to start; no sharp edges; tight contacts; wire size part of SHERMAN catalog number; easy to order and use; bolt, spacer and nut an integral assembly; tough bronze in every part.



Order thru
your Jobber

H. B. SHERMAN MFG. CO.
BATTLE CREEK, MICHIGAN

Now a Scientifically Designed VENTILATING FAN THAT MEETS EVERY TEST

You can make money by selling the Ventura Ventilator—the new, efficient fan that stores, offices, factories, garages, theaters and restaurants can't afford to do without.

Inspect its streamline ring (Fig. 1). It serves as both fan inlet and discharge outlet. It is the result of years of practical experience and research by American Blower Engineers.

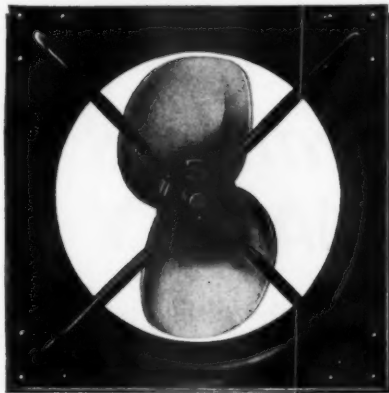


FIG. 1

Then look at the fan blades (Fig. 2). Why, they're different! But they give an immediate impression of handling a lot of air—and tests prove it!

Compare the new Ventura Fan Wheel (Figs. 2 and 3) with any other type you've ever seen and you'll

know it's right.

Tests conducted in accordance with the Standard Test Code of the American Society of Heating & Ventilating Engineers demonstrate that the new Ventura Fan is so superior there just isn't any question. Compare



FIG. 2

your total installed cost for these new square plate fans with circular frame fans. From the cost standpoint alone you will find you are dollars and cents ahead, to say nothing of the extra air handled. Glance over the power consumption figures on tests run according to the standard practice of the American Society of Heating & Ventilating Engineers and you'll immediately see that, for the amount of air handled, comparisons do not exist for this fan.

Quietness in operation, too, is a factor. You've heard ordinary fans and that's "enough said," but wait till you hear this one run (Figs. 4 and 5). Operating at top speed it is actually as quiet as a small sailboat slipping through the evening breeze.

Measure it against fans of many more blades (Fig. 3), and you'll find the same results—greater capacity,



FIG. 3

—all combining to prevent any drumming effect.

lower power consumption and quieter operation.

Look at it from the standpoint of vibration (Fig. 1). The motor is quiet operating, spring suspension mounted (patented feature), the conduit is flexible, to preserve the resilient motor mounting, and the motor supports are of sturdy round seamless-steel tubing



FIG. 4

Complete sales and advertising plans are ready to make this fan a fast seller. Mail the coupon for free copy of the new 1934 American Blower Blue Book—tells where and how to make money.

AMERICAN BLOWER CORPORATION, DETROIT, MICHIGAN
CANADIAN SIROCCO CO., LIMITED, WINDSOR, ONTARIO
BRANCH OFFICES IN ALL PRINCIPAL CITIES
Division of American Radiator and Standard Sanitary Corporation



FIG. 5

AMERICAN BLOWER CORPORATION, 6000 Russell Street, Detroit, Mich.
BRANCH OFFICES IN ALL PRINCIPAL CITIES

Please send a FREE copy of the 1934 American Blower Blue Book.

Name _____ Address _____
City _____ State _____ (1300)





RELIABLE *Guarantees* of LASTING QUALITY

Like the Sterling mark on superior silverware, the distinctive green core in each roll of Panther and Dragon Tape is your assurance of enduring quality. Not only does this stronger core serve to distinguish Panther and Dragon from ordinary tapes when new, but also when the tape is in use *and all other means of identification* have been removed. This is strong proof of Okonite's confidence in the ability of these tapes to maintain longer their inherently greater strength and adhesiveness. Few other tapes can stand this test.

Stronger, longer-lived, the first tape to be wrapped in Cellophane and sealed—a truly modern package—Panther and Dragon Tapes evince in every detail the Okonite Company's established reputation for quality.

Dragon and Panther Friction and Rubber Tapes are
Sold only through jobbers

HAZARD INSULATED WIRE WORKS

Division of

THE OKONITE COMPANY

Factories:

Wilkes-Barre, Pa.

Passaic, N. J.



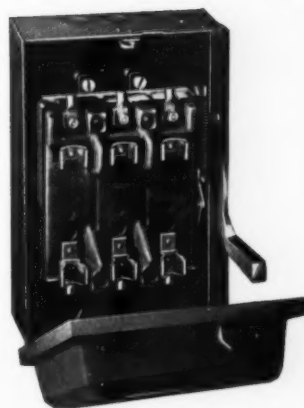


"I'll O. K. Square D without argument"

● "It's a good job, boys. You have my approval. Now for the electrical equipment. I've used Square D switches for twenty years—and experience counts. I'll O. K. Square D without argument. I'd like to see all the electrical equipment Square D. I suggest you call in the Square D man. Get his suggestions—and let him show you what Square D has to offer in switches, panels and motor control."

Experience has taught factory executives and plant engineers what Square D stands for—unfailing service, low maintenance cost, increased production.

The easiest man to please is the man of experience—give him an honest installation and he is your best advertiser. It's safe to use Square D.



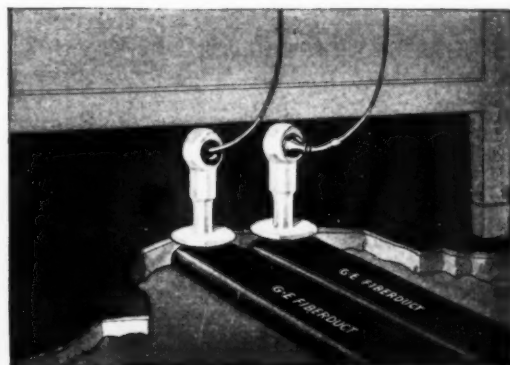
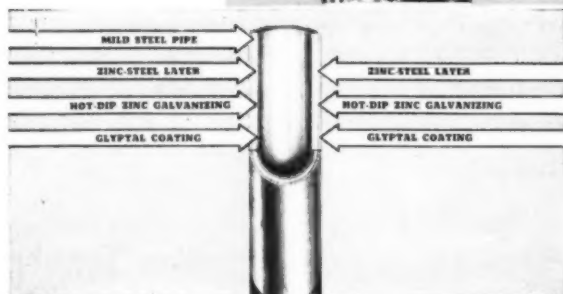
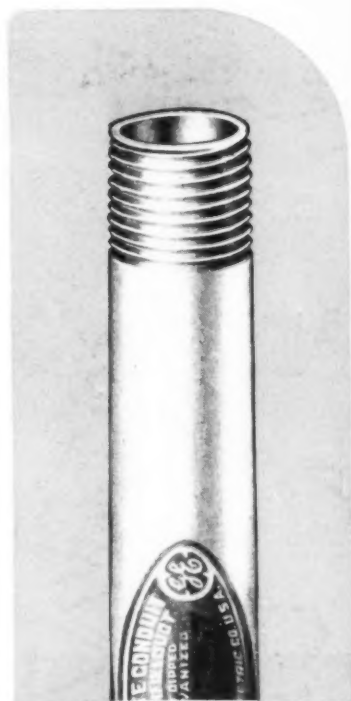
The Square D '50,000 Series' industrial safety switch. Compact design, but large wiring space. Front operation. Positive pressure fuse clips. Built in sizes from 30 to 200 amperes.

SQUARE D COMPANY

DETROIT MICHIGAN USA MILWAUKEE WISCONSIN
SQUARE D COMPANY, INC., LOS ANGELES, CALIFORNIA

USE G-E WHITE CONDUIT

G-E WHITE is explosion-proof. Hot-dipped galvanized and glyptal coatings safeguard against corrosion. G-E WHITE cuts, bends, and threads easily. Outlasts the building.



USE G-E FIBERDUCT

G-E FIBERDUCT provides permanently adequate underfloor wiring. G-E FIBERDUCT is safe . . . economical . . . adaptable . . . easy to install. When wiring modern offices . . . use G-E FIBERDUCT.

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